REFLECTIONS

ON THE

WORKS OF GOD,

AND OF HIS

PROVIDENCE,

THROUGHOUT

ALL NATURE, FOR EVERY DAY IN THE YEAR.

TRANSLATED FIRST FROM THE GERMAN OF MR. C. C. STURM.

BY A LADY.

A NEW EDITION.

VOL II.

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THE SYSTEM OF THE WORLD.

I HE sun, of all parts of the system of the world, is that which interests us the most. Its form is spherical, and it is composed of a fiery fubftance which never confumes. There are spots in certain parts of it (as may be feen through telescopes), which shew that it moves round its own axis. This body is one hundred millions of miles distant from us. It is a million of times larger than our earth, the circumference of which is more than 24000 miles; it communicates its light to 19 opaque globes, which take their course round it at different distances, and are called planets. The nearest to it is Mercury, which is in a manner buried in the rays of the fun; and this being so close to it, is the reason, that, of all the planets, we know the least of it. A little farther is Venus, which is called the morning star, (poetically Lucifer,) when the rifes before the fun, and the evening star, (poetically Hesperus,) when she Vol. II.

fets after the fun. Next to Venus comes our globe, the furface of which is composed of land and water, mountains and vallies; and the interior part confifts of beds and strata of different substances. This earth is the abode of a multitude of creatures, both animate and inanimate, metals, plants, and animals. The moon turns in a particular orbit round us, and accompanies our globe in the whole circle it describes round the fun. It is fifty times smaller than the earth; and there are visibly distinguished in it some parts that are light and shining, and others that are dark and dull: the first, supposed to be continents, and the other feas. For, if the moon were composed only of one substance; if it were a body entirely folid, or entirely fluid, it would reflect the rays of the fun all the fame way, and we should not see those spots in it. A fluid body, fuch as water, absorbs a great quantity of rays, and only reflects a part of them: it is therefore very apparent, that the dark parts of the moon are feas, and that the bright parts are land. Amongst the light parts, some are more brilliant than others, and even cast a shade. They must then be higher than others, and refemble our mountains. Some of those mountains are alone, others are contiguous, and sometimes form very long chains. In the seas of the moon, some parts are observed to be less dark, and appear, confequently, to be like our islands. The four last planets of our solar system are

Mars; Jupiter, with his four moons, or fatellites; Saturn with five; and the Georgium Sides with two already discovered, and probably more. There are spots also visible to us in them. Georgium Sidus is so far from the sun, that he requires no less than 82 years to finish his revolution. This vast domain of the sun, which, without reckoning comets, extends to more than 400 millions of miles, is however but a part of the universe. For each of the fixed stars, the number of which is perhaps more than the grains of sand on the sea-shore, may be considered as a sun, which, if it does not surpass ours, at least equals it in size and splendor, and its insuence extends perhaps still farther.

Such is the wonderful greatness of the works of God, and thus the heavens declare the glory of the Lord! Is there any thing in nature more proper to inspire us with sublime ideas of the Deity, than the sight of the celestial sky? Can we ever raise our eyes to heaven, without having the most lively sense of the magnificence and greatness of him who gave being to all things, and who governs them with incomprehensible power, wisdom, and goodness! What are we poor miserable mortals, lost in the immensity of the creation, who crawl like insects on a grain of sand? what are we, in comparison of those innumerable solar systems, which contain so many vast globes within their circle?

What are we especially, in comparison of the Creator of all these worlds, these suns, and these skies, which if we attempt to measure, trouble and confound the understanding. And yet this sovereign Ruler of the immense universe deigns to honour us with his protection and paternal care. How adorable are all his mercies!

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REFLECTIONS ON THE BLOSSOMS OF TREES.

in influence extends between his farther. AT this instant, in which our gardens and fields are adorned with all the ornaments of Spring, all Europe appears with equal pomp. and every where prefents the most cheerful profpect. The power of the first word pronounced by the Creator when he formed the world, produced all these magnificent effects. One hand alone, the hand of the Creator and Ruler of the world, has in a few days renewed, and in a manner created the earth again, for the use and pleasure of his intelligent creatures. Come, O man! come and try what thy wisdom and power can do. Art thou able to make a fingle tree blossom, to call from the earth the smallest blade of grafs, to order a fingle tulip to appear in all its beauty? Draw near, learned artists, skilful

painters, and contemplate these flowers, examine these master-pieces with the most scrupulous attention; is any thing wanting to their perfection? Do you find any fault in the mixing of the colours in their form, or proportion? Could your pencil express the dazzling red of the peach bloffom? Could you imitate the fine enamel, the uniformity and fimplicity with which a cherry tree in bloffom is adorned? But why do I fay, imitate? Are you even capable of feeling all the magnificence of renewed nature, or of forming to yourfelf a just idea of its inimitable art? If there were no stronger proofs on earth of the power and wisdom of God, the flowers of fpring alone would be fufficient to convince us of it. His power evidently appears throughout the whole. Each tree that bloffoms. each herb and flower proclaims his goodness and wisdom, which is over all the earth. We remark an infinite variety in the bloffoms of trees. All are beautiful; but their beauties are different. One furpasses another; but there are none. which has not fomething pleafing peculiar to itfelf. However great the Creator in the depending his gifts, he still reserves to himself the liberty of bestowing more on some than others. But this difference is only in respect to accessary qualities. Such a tree, for example, has bloffoms of a dazzling white; another has red ftripes and shades, which the first wants : some have (added to the beauty of their form and colour.) an

exquisite perfume. But all these differences are only accidental, and do not in the least affect their fertility. Thus, when God does not give us the fame advantages as appear in some of our fellow-creatures, it ought not to afflict or diffurb us; for the loss of any accidental beauty, of whatever nature it may be, does not hurt our real welfare in the leaft. If we are not as rich, as highly confidered, or of as fine a form as others, we may, notwithstanding, be quite as happy, as virtuous, and as pleasing both to God and man: provided we bear the fruits of piety and virtue, we possess real beauty. For why do the blossoms of trees please us, more than the rich colours of a tulip, an auricula, or a ranunculus? It is because the pleasure the latter give us is of short duration, whereas the others give us hope of delicious fruit. Let us not, therefore, confine our wishes to the beauty and exterior charms of a fine flower. The beauty, the graces, the bloom of health and other outward advantages of nature, are not the things which afford us durable and permanent pleafures. The bloffoms which promife fruit agreeable to God, those are what truly merit our esteem. They will never fade. It is melancholy to know, that all those dazzling beauties we admire in the blossoms on the trees, will disappear in a few days. And yet fuch will be the fate of all the blooming young people now fo vain of their charms. Let this thought ever attend us in the

folitary walks we take in our gardens: and let our chief study be, to act in such a manner, that when the beauty and charms of the body are no more, we may supply their place with abundant fruits of virtue and piety.

MAY III.

CONTINUAL REVOLUTIONS AND CHANGES IN THE EARTH.

MOTION and changes feem absolutely necessary for the preservation of the corporeal world. In the whole universe, there is not the smallest particle in a constant and entire state of rest.-Nothing more easy than to be convinced of this, by attending to what passes on the globe we inhabit. The earth turns, every 24 hours, round its own axis, and, by this motion, all the points of its furface (except the poles) change place with more or less rapidity. Under the line, where this motion is the swiftest, every thing moves more than two leagues in a minute, though it does not change its situation on the furface. But, besides this, the earth makes its annual revolution round the fun, with fo much velocity, that, according to the most moderate calculations, it goes 146 leagues in a minute, though its course is not perceptible. The motion of earthly bodies is more observable. Little

rivulets unite, and form greater. Thefe, in their turn, form torrents, and rivers, which are afterwards lost in the sea. This is not all: plants and animals every where require water to nou-The water rifes in vapours, which form into clouds, and fall again in rain, fnow, and fogs, and whatever is not transformed in its fall goes again into the fea, where the flux and reflux, storms, torrents, &c. keep the water in a perpetual motion. Neither is there any repofe in our atmosphere. Between the tropics, an east wind continually blows; and, though in other places the motion is not always perceptible, yet the barometers and thermometers prove that the air is never perfectly still. Meteors also, of every fort, shew that nature is in constant action. The coat or furface of the earth is also subject to frequent revolutions. The hardest rocks fplit; stones gradually wear and break; lands fall in, others are overflowed; certain grounds rife, and others are overturned by earthquakes; little hills are washed away by waters; vallies are filled up; marshes grow dry, and are covered with trees; the bottom of the fea becomes firm ground, &c. Light and darkness, cold and heat, drought and wet, fucceed each other by turns. Lastly, the continual variation of heat occasions, every hour, changes which are often imperceptible. If we add to this the changes visible in animals, we may have some idea of the continual revolutions to which every thing here

is subject. It is said, that man daily loses about two ounces and an half in perspiration. It is replaced by other particles; so that, at the end of ten years, a man's body is entirely changed. All animals and plant's seed, grow, propagate,

die, and corrupt.

Thus, every thing on earth is in motion; every thing grows and decays by turns. In a word, to be born, and to die, is what continually paffes on the theatre of the world. But this does not happen, as at first fight might be imagined, accidentally, or by chance, without order or defign. Every thing acts according to certain laws, which tend to certain ends. Every thing combines, every thing concurs, in the most perfect manner, to the glory of the Creator. All contributes, all ends in the happiness of the universe. These continual revolutions are useful warnings to us. They teach us that this world cannot be our place of destination. When we consider the continual viciffitudes, which all here below must undergo, is it not the most affecting lesson for us, on the vanity of all earthly things, on the uncertainty and shortness of life, on the necesfity of a better state, an everlasting life in the world to come? Yes, every thing points out to us our true destination, and declares we are but fojourners and travellers on the earth.

What consolation it is, in the midst of the revolutions of the world, to lift up our eyes to God, who is both immutable and eternal! Let

the mountains be shaken, and fall down, let the sea be troubled, and the waves roar; let all that is earthly be destroyed, and return to dust; still, he is and ever must be invariably the same.

M A Y IV.

AN INVITATION TO SEEK GOD IN THE WORKS OF NATURE.

AWAKE, Omy foul, awake from the slumber in which thou haft been so long plunged, and be attentive to all around thee. Confider thyfelf and all other creatures. Reflect on their origin, their construction, their form, their use and a thousand other circumstances, which must fill every attentive observer of the works of God with admiration. When thou feeft the fky. with its variety of lively colours, the stars which shine so bright, the light which discovers to thee the objects around? ask thyself, from whence proceeds all this? Who formed that immense expanse of heavens? Who placed in the sky those innumerable fires, those stars, which, though at so prodigious a distance, dart their rays even unto us? Who ordered the stars to move with fo much regularity, and the fun to give light and heat to the earth? Is it not our adorable Creator! Yes, it is his mighty word, that called forth all things, and ordained them

to exist and live. What must be his greatness, his incomprehenfible greatness! Howinfinite his goodness to have planned every thing, that all contribute to our happiness! Stupendous mountains! what mighty hand fixed your foundations! Who raised your heads to the very clouds? Who adorned you with forests, with fruit trees, with plants, and flowers? Who covered your tops with fnow and ice? Who caufed to flow out of your bowels those springs and rivers, which water and enrich the ground? It is thy hand, O almighty Creator! which has done all thefe wonders: and I adore that divine hand, with. fentiments of admiration, respect, and gratitude. Flowers of the field! who gave you your magnificence cloathing? How happens it that you were produced out of a little earth and a few drops of water! From whence have you that variety of perfumes, which embalm the air and delight us, those lively colours, which charm our fight, and which no human art can imitate? This is thy work, O Lord! every thing on earth proceeds from thee. And you, O ye animated being, who people the air, the waters, and the land, to whom do you owe your existence, your construction, and those instincts so various and so wonderful, which aftonish our reason, and are fo well adapted to your nature and way of life? What a multitude of wonders may I not observe in myself? How does a handful of dust become a body, well organized? How is it that

one of its parts has fight; that another, by means of the undulation of air, is informed of the thoughts of other people; that one part tastes the different flavours of food? How is it that I have the faculty of communicating my ideas and defires? How does a little matter bruised by my teeth afford me so many agreeable senfations? I acknowledge the hand of my Creator, in all these incomprehensible wonders. His wisdom, power, and goodness, all combine to render us happy.

MAYV.

THE DAWN OF DAY.

THE morning dawn discovers to the world a new and magnificent creation. The shades of night deprive us of the fight and enjoyment of the earth and sky: But when the light of day returns, we behold all nature renewed and embellished. On a sudden we see the earth arrayed in all its magnificence; the mountains crowned with forests; the hillocks clothed with vines; the fields covered with their harvests, and the meadows watered with rivulets. The horizon glows; the clouds are all tinged with variety of the liveliest colours; cheerful flowery vales are discovered at a distance; light vapours arise and change to gold; and the dew-drops that fall on

the flowers take the mild luftre of pearls. By degrees, as the light increases, the spectacle becomes more magnificent, till at last nature prefents us with her most glorious object. The fun rifes; and the first ray that escapes over the mountain which had concealed it from us. darts rapidly from one end of the horizon to the other. More rays follow, and strengthen the first. By degrees the disk of the sun comes out, and shews itself entire; then advances farther into the sky. and runs its course with a majesty which the human eye can no longer support. Were any one fuddenly to fee this delightful scene for the first time from the top of a hill in the country, what would he think? what would he do? Ah! doubtlefs, he would prostrate himself, full of sweet emotion and pious respect, to adore that God who is the Author of the fun: and in the beauties of the rifing day, to acknowledge his power and wisdom. With the lark, who towering in the air falutes the morn, and proclaims its arrival by the sweetness of its notes, he would foar towards thee, O Lord! who art Father of the whole creation. The joy and gladness of all nature, the animation of every being, invite us to raise our souls towards thee with the most lively transports of gratitude and joy. At this moment, while the fun is darting his first rays upon the earth, millions of creatures praise and adore thee. From thee proceeds each beauty of the morning dawn; from thee who art the fource

of light. It is thou who hast given it those lovely colours, and impressed a sense of them on our souls. Thou hast given us souls of a heavenly nature, capable of tracing thee in all thy works. Our eyes seem to behold thee in the splendor of the rising sun.

But are not those indolent men much to be pitied, who never gave themselves the heavenly pleasure of contemplating the rising sun? O if they were but rational enough to indulge in the pure and delightful enjoyment which this magnificent object of nature is so calculated to inspire! If they could but feel, that the sight of beauteous nature must naturally fill the heart with pious delight, and prosound veneration for the Creator! If they could, in sine; comprehend, that one single thought, which rises in the soul, on seeing the dawn of day, may become the happy beginning of a virtuous life, would it not be worth giving up some hours of sleep sor it?

M A Y VI.

Wonders of Vision.

NO object can become visible to us, unless rays of light proceed from them, and fall upon our eyes. Those rays which enter into the eye, pass through the cornea, through the watery humour, through the pupil, and penetrate at last

even into the crystalline. After havingbeen fufficiently refracted and collected together in this place, they paint on the retina (behind the glaffy humour) the image of the outward objects, and they draw it with a perfect exactness and clearness. The rays then touch the optic nerve, which is as fenfible as the finest string of a harp-This nerve, by its motions and vibrations, produces different fenfations in the foul, and excites perceptions and ideas in it conformable to the impressions which the outward objects make upon the brain. What has just been faid, of the fight, shews that it is one of the chief wonders of human nature, and well deferves fome reflection upon it .- The image of all outward objects is painted on the retina upfide down, and yet we see them right, and in their real situa-How is it, that the largest objects are painted in our eyes extremely small, and yet we fee every thing according to its real fize? How is it, that when we see from a high tower some millions of houses below us in a great city, that each of them is painted fo exactly in our eyes, on a space which is scarce three times as large as the head of a pin? So many millions of rays come through a very little opening, and collect together on the retina, which lines the infide of the eye, without confounding with one another, and still preserving the same order the points of the object from whence they proceeded had amongst themselves. But this is not all: look from the

top of a high mast at a fleet in full fail; contemplate the fea itself, how many millions of waves will you see? Each of them, however restects a mass of rays upon our eyes, small as they are. Afterwards, on a calm day, go on a high mountain, and look over a country of five or fix leagues extent: each tree, each herb, or even blade of grass, sends rays to us, otherwise it would be impossible we should see a continued verdure on the fields beneath us. -- Is it not also very astonishing, that we do not see double; and, though we have two eyes, that each object appears fingle? Another cause of admiration is, that those objects which we see are not alone vifible to us. We are furprifed at the number of rays they fend to fo small a space as the pupil of an eye, yet they convey as much to spaces of that fize every where. It is for that purpofe, that wherever we go, new rays supply the place of the preceding, and render visible to us the same objects we perceived before we changed place. All the rays necessary for that purpose exist, ready to meet our eyes. But all the rays that are admitted into the eye do not take effect, Along with those there are numberless of others, which, being much weaker, are effaced by the light of the first, but are always ready to do the same offices, when required. If we prick a theet of paper with a pin, and look through the hole, (fo much less than our eye,) we still, however, fee the objects, though they appear much smaller

to us. But who reflects upon all this? The habit of feeing, as foon as we open our eyes, makes us confider this operation as a thing extremely fimple and eafy to comprehend. We are however far from being able to explain the manner in which we fee objects. Indeed, we know how the image forms itself in the bottom of the eye. We also know what all the parts which compose it contribute to it. But that is not fufficient: for the eye can have no idea of what passes in it. It is therefore necessary, that the impresfions which the rays make upon it should reach to the brain; and that, in order to do fo, the rays should paint the image on a coat woven with nerves, which correspond with those of the brain. In this manner the motion impressed by the rays on the nerves of the retina, is transmitted by the optic nerve to the brain. But we cannot properly describe what passes there; because we do not perfectly know, either the nature of the brain, or the use of its several parts. These wonders, which are beyond our conception, are evidently the work of the divine Power united with infinite goodness, as they are all so many bleffings bestowed upon us.

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MAY VII.

SPRING RENEWS THE FACE OF THE EARTH.

W HAT a change is there throughout all nature, and how great is the goodness of that supreme Being who causes the seasons to succeed each other fo regularly. Our earth which rested during winter, refumes its ornaments and its fertility. The whole creation is animated, revived, and full of joy and gladness. A very few months ago, the whole furface of the earth was barren and defart. The vallies, the prospect of which gives us now fuch pleasure, were buried in a deep fnow. The mountains, whose grey tops rife to the very clouds, were covered with fnow and ice, enveloped in impenetrable fogs. In those verdant walks, which the nightingale now inhabits, nothing was feen but dry leafless branches. The rivers and streams, which murmur as they flow, were stopped in their course by the ice, which froze them. The birds, which now fill the air with their fongs, were insensible, in caves and marshes, or gone to There reigned a mournful other countries. filence every where; and, as far as our fight could reach, we faw only a difinal folitude. But scarce has the almighty breath been felt, when nature awakes from its inanimate state, and fpreads pleafure and a thousand charms around

us. The fun approaches our globe; and, at once, the atmosphere is penetrated with a quickening warmth; the whole vegetable kingdom proves its beneficent effect; and the earth produces grass, flowers, and greens of every fort. Now, the whole face of the earth is renewed and embellished. At the fight of this happy revolution can we fail of looking up to the great Being, who is the cause of all.

"Lord, thou visitest the earth, and makest "the vallies to fmile. Thou fprinklest them " with dew to enrich them, and the fprings with "which thou waterest them are always plenti-" ful. At thy command, our harvests are ripe, " and fill our hearts with joy. Thy bleffing is " upon our furrows, and the rain refreshes the "dry earth. Thou makest it soft, and blessest " the feed. Thou crownest the year with thy "bleffings. Thy word maketh the ground " fruitful. Under thy steps the flowers and " fruit spring up. Bleffing and fruitfulness are " thine. The pastures of the defart are watered, " and the little hills are adorned with a beauti-" ful verdure. The countries are covered with " flocks, and the vallies are full of corn. Every " place refounds with fongs of joy and gladnefs. "The praises and thanksgivings of all nature " rife to heaven itself."

In this revolution, which the spring brings with it, I behold an emblem of the salutary change which a soul experiences, that has not resisted the operations of the divine grace. Ignorance vanishes; folly and vice disappear; the passions are subdued; the heart is sull of virtuous and religious sentiments, which delight and edify mankind.

MAY VIII.

THE SPRINGING UP OF SEEDS.

I HERE are at prefent many changes making before our eyes in the vegetable kingdom, but there are still many more which escape our fight, and which nature does in fecret. The feed, fome time ago fowed in the ground, fwells, increases, and the plant by degrees shoots up and grows. This mechanism deserves so much the more attention, as it is, properly speaking, the fource of all the beauties which fpring and fummer present us with in the vegetable kingdom. The feed is composed of different parts, according to the different species; but the chief is the germ. Each shoot has two parts; the one simple, which becomes the root; the other scaly, which rifes and becomes the stalk and head of the plant. The body of most plants is composed of two pieces, which are called lobes, that are filled with a mealy fubstance, which serve for seminal leaves to the plant. Mosses have the most simple feed of any. It consists only in the

shoot, without pellicles or lobes. A certain degree of moisture and warmth are absolutely necessary to make the feeds spring up. The increase of heat, and the difference observable in the taste and smell, feem to discover here a fort of fermentation. By means of this preparation, the mealy substance of the lobes becomes proper to nourish the tender shoot. It is known by experiments, which have been tried with coloured juices, that this fubstance sucks in a moisture, which furnishes a proper nourishment. with the affistance of air and of heat, till the plant has acquired confishence enough to profit by the juices which the root procures for it. Then the exhaufted lobes dry by degrees, and, at the end of a few weeks, fall off, when the plant no longer requires them. Certain herbs; which grow on mountains, are of a very particular nature. As their duration is short, it would often happen that the feed would not have time to ripen. In order, therefore, that the species should not perish, the bud, which contains the shoot, is formed at the top of the plant, puts out leaves, falls, and takes root. But. when the plant comes out of the earth, it would run too great risk, if it was at once exposed to the outward air and the power of the fun. Its parts, therefore, remain folded, and laid one upon another, nearly as it was in the feed. But, by degrees, as the root strengthens and stretches on all fides, it furnishes the upper vessels with

abundance of juice, by means of which all the organs fron unfold themselves. The plant is, at first, almost gelatinous, but it gradually acquires more confisence, and is always in-

creafing.

This abridgment of the history of the shooting of plants is fufficient to shew us, how many preparations and means nature makes use of to produce one fingle little plant. When, therefore, we fee a feed fpring up, which we have fowed, we must not imagine (as it usually the case) that it is not worth our attention. It is one of those wonders of nature, which is subject of reflection for the greatest men. At the fight of this phenomenon, let us filently admire the power and wisdom of that God, who is adorable in all things. The order with which the plants fo regularly succeed one another, is a proof of that wifdom, which manifests itself, even in the fmallest things. This reminds us that our moral nature also, contains a certain feed, which shoots with years, which grows and bears fruit. In the defigns of the Creator, this was a means to lead us to happiness; but our natural corruption, and outward circumstances, often defeat those merciful intentions.

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M A Y IX.

THE CHICKEN IN THE EGG.

W E are much obliged to the naturalists for taking the trouble to make inquiries into the generation of animals, and spreading more light upon the subject. Nothing contributes more to the glory of the Creator, than the observations. made on the wisdom which appears in the production of animated beings. The lefs we are able to give an account of all his works, the more earnest we should be to take every opportunity of knowing some of them at least. With this view, let us now consider the formation of the chicken in the egg; fuch as has been difcovered by one of the greatest naturalists. The hen has scarce sat on the egg twelve hours, when there begin to appear some lineaments of the head and body of the chicken, which is forming. The heart is feen to beat at the end of the fecond day: it has at that time the form of a horse-shoe, but no blood yet appears. At the end of 48 hours two vehicles of blood can be distinguished, the pulsation of which is very vi-One is the left ventricle, the other the root of the great artery. At the fiftieth hour one auricle of the heart appears, and refembles a nooze folded down upon itself. The beating of the heart is first observed in the auricle, and afterwards in the ventricle. At the end of fe-

venty hours they diffinguish wings, and on the head two bubbles for the brain; one for the bill, and two others for the forepart and hindpart of the head. Towards the end of the fourth day, the two auricles already visible draw nearer to the heart than they did before. The auricle which appears first, seems to have two horns, but it is afterwards found to be two auricles. The liver appears towards the fifth day. At the end of 131 hours, the first voluntary motion is observed. At the end of 138 hours, the lungs and fromach become visible; and at the end of 142, the intestines, the loins and the upper jaw. At the 144th hour, two ventricles are seen, and two drops of blood, instead of the fingle drop which was feen before. The feventh day, the brain, which was flimy, begins to have fome confistence. At the 190th hour of incubation the bill opens, and the flesh appears in the breast. At the 194th, the sternum is feen, that is to fav. the breaft bone. At the 210th, the ribs came out of the back, the bill is very visible as well as the gall bladder. The bill becomes green at the end of 236 hours; and if the chicken is taken out of its coverings, it evidently moves itself. The feathers begin to shoot out towards the 240th hour, and the skull becomes grifly. At the 264th, the eyes appear. At the 288th the ribs are perfect. At the 331st the spleen draws near the stomach, and the lungs to the chest. At the end of 355 hours, the bill frequently

opens and shuts; and at the end of 451 hours, or the 18th day, the first cry of the chicken is already heard. It afterwards gets more strength, and grows continually, till at last it sets itself at liberty, by opening the prison, in which it was shut up.

It is by fo many different degrees, that thefe creatures are brought into life. All these progreffions are made by rule; and there is not one of them without fufficient reason. If, for example, the liver is always formed towards the end of the fifth day, it is founded on the preceding fituation of the chicken, and on the changes that were to follow. No part of its body could appear sooner or later, without the whole embryo fuffering, and each of it limbs becomes visible at the most proper moment. This ordination, fo wife, and fo invariable in the production of this animal, is manifeftly the work of a supreme Being: but we shall still more fenfibly acknowledge his creative powers, if we confider altogether the manner in which the chicken is formed out of the parts which compose the egg. How wonderful is it, that there should be, in this egg, the principle of life of an animated being! that all the parts of an animal's body should be concealed in it, and require nothing but heat to unfold and quicken them! That the whole formation of the chicken should be fo constantly and regularly the same way! VOL. II.

That exactly at the same time, the same changes take place in twenty eggs, or more, that a hen hatches! That when the position of an egg is changed, and turned from one fide to the other. it does not in the least hurt the fœtus, or prevent its formation! That the chicken, when it is hatched, is heavier than the egg was before! Even these are not all the wonders in the formation of the chicken. The microscope and the observing spirit of man have only discovered what falls the most under our fenses. How many things may still be referved for those who come after us, of which we shall not have a perfect knowledge, till in a future state! How many inquiries may be made upon this mystery of generation! Inquiries which the human mind can never resolve: but let not this ignorance discourage us; let us only think of making a good use of the small degree of knowledge we have, by leading us to admire and praise the wifdom and goodness of our Creator.

MAY X.

ON THE BUDS OF FLOWERS.

ON all fides, I discover a multitude of flowers in the bud.—They are at present enveloped and closely shut up in their intrenchments. All their beauties are hidden, and their charms are

veiled. Such is the wretched mifer, who lives by himself, who centers all in himself, and whose views are mean and felfish; who connects every thing with himfelf; who makes his own private advantage or pleafure the only object of his defires, and the narrow motive of his actions. But foon the penetrating rays of the fun will open the buds of the flowers, and will deliver them from their filken bonds, that they may blow magnificently in our fight. With what a charming bloom they will then shine! What delightful perfumes they will exhale! Thus, also, may the most fordid miser become beneficent, when his foul is enlightened by grace. To a heart of stone may succeed a feeling and compassionate one; a heart susceptible of the sweetest and tenderest emotions. By the mild influence of the Sun of Righteoufness, the focial affections discover themselves, and open more and more. Sensibility no longer centers in one object; it becomes universal; it takes in all mankind; it extends its generous cares. and all that is within its reach is benefited by it. When I reflect on the buds and blossoms, I think of you, O lovely youth of both fexes! The beauty and power of your minds are not unfolded. Your faculties are still in a great measure concealed. The hope which your parents and masters conceive of you will not so soon be realized. When you walk with your parents in the coun-

try or gardens, confider these buds, and say to yourselves, I resemble that bud; my parents and masters expect from me the unfolding of my talents and faculties; they do every thing for me; they neglect nothing for my information and instruction; they watch most tenderly over my education, to the end that I may become their joy and comfort, and make myfelf ufeful to fociety. I will, therefore, do all in my power to fulfil the pleasing hopes they form. I will take advantage of all the improvement and infiruction they give me, in order to become every day wifer, better, and more amiable. For this purpose, I will take care not to give way to the defires and passions of youth, which might be fatal to my innocence, and destroy all the hopes conceived of me.

"In the morn of life, I bloffom like the bud which infenfibly opens. My heart beats with joy, yields to the most cheerful hopes, and fees nothing but happiness before me. But if I am imprudent enough to give a loose to mad defires and the false pleasures of luxury, those guilty staines will soon corrupt my young heart."

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MAY XI.

INDEFATIGABLE LABOURS OF THE BEE.

IT is one of the advantages of Spring, that it furnishes us with an opportunity of observing the industry and labours of the bee. Certainly, a beehive is one of the finest fights a lover of nature can ever have. We cannot tire contemplating that laboratory, where millions of artificers are employed in different works. We are in a continual state of surprise on seeing their order and regularity; and particularly in those magazines, fo plentifully furnished with all that is necessary for the subsistence of the society in winter. What most deferves attention is, the indefatigable application and uninterrupted labours of this little colony. The bees give us an example of industry and activity, which is not only uncommon, but perhaps has not its equal. They appear as foon as winter is over, even when it might still be feared that the cold would hurt them, and benumb their delicate limbs. When the juices of the flowers, which begin to blow, have not yet been fufficiently ripened by the fun, fo as to furnish honey in plenty, the bees still gather some little for their food. But their cares and activity redouble very evidently during spring and summer. They are never idle in those seasons. They do all they can; and do not despise small profits, provided they can

only increase a little their provisions. building their cells they are fo indefatigable, that we are affured that a honey-comb of double cells, fuch as three thousand bees can lodge in, is dispatched in twenty-four hours. whole work is divided amongst the members of the colony. While fome of the bees are gathering the wax, preparing it, and filling the magazines, others are employed in different works. Some take the wax, and make use of it to build their cells; others knead it, polish, and purify it; others gather the honey from the flowers, and lay it in the hive for the daily subfistence, and for future occasion. Others still close, with a covering of wax, the cells in which they keep their winter provision of honey. Some carry food to their young, and close with wax the cells of the little ones that are near the time of transformation, to prevent their being disturbed in working their way out. Some closely stop up, with a fort of bird-lime, all the chinks and holes in the hive, and cover all the weak places, that neither the wind nor little infects may find entrance. Some drag out of the hive the dead bodies which might infect them; or, if these dead bodies are too heavy to be carried away, they cover them over with bird-lime or wax, and cement them in fuch a manner, that in corrupting under that crust, they cannot occasion any bad fmell.-But it is not enough to admire the activity of these little creatures: it ought to

give us emulation, and serve us as a model. We have many more motives for diligence than those insects: we have an immortal soul of inestimable value. With what application ought we to labour for its happiness, and avoid what might lead to its ruin! What is more calculated to excite us to activity and indefatigable diligence, than considering that the fruit of our labours does not merely extend to a few days and years, but to eternity itself? Let us, therefore, never be slothful or idle in doing good; but let us acquit ourselves of our duties with all possible zeal and fidelity.

MAY XII.

How Providence has PROVIDED FOOD FOR ANIMALS.

ROM the elephant to the mite, there is no earthly animal which can live without food and nourishment; from the eagle to the gnat, no bird can do without it; from the leviathan to the smallest worm, no reptile can subsist without eating; from the whale to the oyster, there is nothing in the waters to which food is not necessary. But in forming these creatures thus, God has at the same time ordained, that there should always be in abundance great va-

riety proper for their fustenance. As many species of animals as there are, so many forts of food are there for them. There is no beaft on earth that does not find the food adapted to its nature. We may, in this respect, divide animals into three chief classes. The first comprehends those that feed on the flesh of others: some (like the lion) love only the quadrupeds; others birds (as the pole-cat), others, again, only fish (like the otter), and lastly, some love only infects, as feveral of the birds do. There are fome exceptions in all those; but, in general, it is certain that each species has its particular food defigned for it by the Creator. cond class includes the animals which feek their food amongst vegetables. Almost every fort of plant has its particular preference. Some animals prefer grafs, others fruit-trees; and amonoff those which love the same plane there is still a remarkable difference: fome only feed on the roots, others on the leaf; fome love the stalk or body of the plant, others the marrow or feed, or the whole fruit; there are some also which eat the whole plant. Those that feed on minerals belong to the third class: they are mostly infects; and it is rather difficult amongst them to ascertain what food such and such fort in partieular require; because those little animals cannot be fo eafily observed as others. It is known, however, that some of them feed on earth, others on flones. And if we confider, that there is

fearce any beaft or plant, which does not ferve as food to fome animal, we shall easily conceive. that it must be the same in respect to the mineral kingdom; and that there is nothing there which does not ferve, directly or indirectly, as food for fome infect. I here comprehend the words of David: "The eyes of all wait upon thee, O "Lord, and thou givest them their meat in due: "feafon. Thou openest thine hand, and fillest all things living with plenteoufness. The cares of divine Providence are evident proofs of that eternal goodness, which extends over the whole universe. Reflect on the prodigious number of animals which exist. How many millions of species of birds and insects, and how many hundred millions of each fort! All these creatures find their daily sustenance. How many millions of animals live in all parts of the: earth! How many hundred millions of each: kind find dwelling and food in the forests, the fields, the mountains and vallies, in the caves: and hollow part of rocks, upon trees, and in trees, in turf, in stones, &c. ! What innumerable shoals inhabit the ocean! what immense. numbers of fish swim in the sea, and in rivers! All these creatures find there daily food. Howinexpressible the multitude! How aftonishing the variety of infects, which every where furround us, millions of millions repeated! Infects. in the air, in plants, in animals, in stones; infects in other infects! All of them; constantly, find there daily food. How infinitely also does the wisdom of the Creator shine forth in his manner of providing for all these animals? He gives them all the food fit for them, and adapted to their nature; for each kind of food does not indifferently fuit all animals: a particular fort is required for quadrupeds, another for birds, others still for fish and insects. This distribution of food is a means wisely ordained by the Creator, to afford sufficient food for each species of animals; and to prevent any of the fuftenance which the earth produces, from being useless. But if God so provides for animals void of reason, what will he not do for man? Such is the conclusion we may, and ought to draw, from feeing the plan of divine Providence, which gives to all the beafts of the earth every thing necessary for their support. Oh man of little faith! anxious, reftlefs, discontented man go and reflect on the goodness with which the Lord fustains the life of animals; and let that teach you to be content, and trust in God. Behold the birds in the air; the fallow deer on the rocks, and in caves; the fish in the sea; the animals in the fields and the forests, every thing finds food and habitation fit for it. Great in the smallest things, as well as in the highest, God does not disdain or neglect the poorest worm on earth.

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MAY XIII.

THE SENSES OF ANIMALS.

IN all animals the organs of the fenfes are disposed in a manner conformable to their nature and defign. It is by their means that they take in knowledge of objects, either near or distant, and that they are enabled to provide necessaries, and to guard against dangers. The feeling is what they call that fense by which animals may form to themselves an idea of corporeal objects as foon as they touch them. This fense, in beasts, as well as in mankind, has its feat under the outward fkin, the extremities of which are covered with a multitude of nerves: or finews. It cannot be exactly afcertained, what revolutions the feeling goes through in the greatest number of beasts. It is even doubtful if infects are not endowed with another fense, and if their horns may not be the organs of an unknown sense, which men are entirely deprived of. Birds, fish, serpents, and some other animals, appear not to have it. The organs of taste are principally the tongue and the palate. which receive the impressions of relish; but the papillæ are the immediate instruments of it; as: likewise of the touch. There is, accordingly, much analogy between those two senses. The fmell has for organ the membrane which lines the nose. It is by means of a collection of small nerves there, that they perceive part of the odo-B 6

rous vapours which swim in the air. Animals who require a nicer and keener smell are, therefore, endowed with a greater perfection of this organ. Worms appear entirely without any, and perhaps also fish and infects; but it is posfible that, in the latter, the horns may be the organs of smell. By means of this sense, beasts find all that is necessary for the preservation of their life. Birds and reptiles their food, and many animals are warned by it of the approach of their enemies. The hearing conveys to animals the fluttering and vibrations of the air. The construction of the ear is not the same in all beafts. Some (like the lizard) have two drums; fome are deprived of feveral parts which most other animals have: it is thought, that neither birds, or fish, have that part which is called the fnail, or fhell, and that infects and worms are absolutely deaf. The eyes are the organ of fight. Except the cuttlefish, the hedge-hog, and perhaps a few others, all reptiles are without eyes. Almost all insects, on the contrary, have more than two: most of them have them in profusion, generally collected into two orbits. The spider and scorpion have eight eyes. In one fly there has been reckoned 16,000 eyes, in a scarab 6,362, and even 34,650 in a butterfly. The number and position of those eyes make the insects amends for not being able to move or turn them. The fish. have none of the watery humour, but their cry-

stalline is almost entirely round. All the organs of the fendes are evidently disposed in a manner conformable to the make of animals, and their feveral wants. Very few observations are necesfary to convince us of this. As the eyes of most infects are immoveable, and, of course, useless. to them on many occasions, nature, to supply the defect, has given them horns, by means of which they differn dangers which would escape their fight. The eyes of fish are disposed with equal wifdom: a full projecting eye would not fuit them, for which reason their comea is quiteflat; but, to remedy this defect, the Creator has given them a crystalline perfectly spherical; whereas, in animals that live in the air, it is lenticular, and confequently flatter. Although the form of all eyes is round, there is a vifible difference in this roundness. The fituation even in the head is infinitely varied, according to the different deligns and wants of animals. In man, who fees little but what is before him, the eveis placed on the forepart of the head, but for contrived, that he can receive the impression of near the whole demi-circle of objects before him. In birds, on the contrary, the eye is placed infuch a manner, that it admits almost the whole circle of the objects around it: from thence, they are better able to get their food, and to. thun the dangers to which they are exposed. The human ear has the form best adapted to the upright posture. In the birds, it is more proper

for flight; without projecting, that it might not interfere with their progressive motion; but close, and covered, in order to leave them a

free passage through the air.

What wisdom! what economy! what admirable art, in the arrangement, and the whole disposition of the senses of animals! But, perhaps, we only know the smallest part of this wonderful mechanism; and, undoubtedly, most of our observations in this respect deserve less the names of discoveries than that of probable conjectures. If we could have a more perfect knowledge of the interior construction, and use of the fenses of animals, we should have still more reason to admire the wisdom of God. Let us, at least, employ the little we know of it in praising and glorifying our common Creator. The more imperfect our knowledge of animals is, the more we ought to abstain from looking upon them with indifference and contempt. Let us rather consider them as a mirror of the divine power and wisdom.

MAY XIV.

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ORDER IN THE SUCCESSION OF FLOWERS.

EACH plant appears on the earth in the order prescribed it. The Creator has exactly fixed the time, in which one is to unfold its leaves, an-

other to bloffom, and a third to wither and fade. We have feen, some weeks past, the white winter bloffom, or early violet, fpring up. A long time before the trees venture to open their leaves, and when the earth was still covered with fnow, it dared to peep out; and is the first of all the plants, and the only one which delighted the eye of the florist. Next appeared the faffron-bloffom, though timidly, because it was too weak to bear impetuous winds. With it appeared the fweet violet, the auricula fo admired for its brilliant colours and the variety of its species. All those plants, and some others which appeared on the mountains, were the vanguard of the army of flowers; and their arrival, fo agreeable in itself, had, besides, the merit of proclaiming the coming of a multitude of other flowers. We now fee, in reality, the other children of nature appear, not all at once, but in a regular fuccession. Each month displays the ornaments peculiar to it. The tulip begins to unfold its leaves and its bloffoms. Soon the beautiful anemone will form its dome, and grow up round and full. The ranunculus will display all the magnificence of its leaves, and will charm our eyes with the most beautiful mixture of colours. And, to crown the lovely affemblage of flowers, the rose will open and bloom with all the beauties which diftinguish it. The carnation will shew itself with the elegance, which makes it so superior to its companions.

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Let us pause here, and reflect on the wife and beneficent defigns evident in this succession of flowers. If they were all to blow at the same time, there would fometimes be a great superfluity of them, and, at other times, a total want. We should scarce have time to observe half their beauties, and we should be too soon deprived of them. But now that each fort of flower has its appointed time and place, we may, in this pleasing succession, contemplate them more conveniently, and acquire a fuller knowledge of them. This beneficent and wife attention of Providence procures one more very great advantage. It not only prefents to us each flower in all its beauty, but it makes up for the frailty of all those levely productions of nature: for, though there are always some flowers fading, there are continually fresh ones coming to adorn our gardens. What goodness in our Creator, thus to favour mankind with a constant train of benefits, not only to multiply, but to render them continual and lasting! He literally leads: us through paths of flowers. Wherever we go, they fpring up under our feet, that the fight and enjoyment of them may enliven and foften the pilgrimage through life. The fame order, in: which plants and flowers succeed each other, is. also seen in the human species. Each man appears in the world in the place allotted to him by the all-wife Being: each is born at the time. chosen by God for his existence. From the

beginning of the world, the generations of men have succeeded one another on this great theatre, in the order, time, and place allotted them by the Creator. In the moment that some are born, others are returning to dust. Whilst one is preparing to be useful to the world, another, who has already acted his part, is going off the stage. Who knows when their turn will come! Let us ever be prepared to resign our place with the tranquillity of a good conscience.

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THE ZOOPHITES.

suitest the besid the heart, the floriach, such I HE zoophites, or animal plants, are certainly insects; though, by their outward form, their immobility, and their manner of propagating by buds and feeds, they are very like plants. These animals, as well as plants, can be multiplied by flips, and by ingrafting. Their animal nature only thews itself by the sensibility and voluntary motion observed in them. Most of the zoophites hold by a fort of root to the fea, or the waters they live in. Some inhabit stony and chalky places; others are enclosed in a case like horn; and lastly, some are entirely foft and fleshy. They have this all in common, that without any preceding connection, new zoophites fpring out of the furface of their

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bodies. Whilft these young animals are fastened to the stalk, they form together one single animal. They are nourished by it, and nourish it by turns. But as foon as they are loofened from the stock, they have their separate existence. The zoophites also multiply in another way, which refembles the generation of plants. There forms a fort of bud, which contains a young animal, that grows fome time with the stalk, which at last falls off, and becomes a complete animal. Should one ever have supposed, that there were animals, whose form was so like plants, and to foring up like them? From the ideas we have always had of the nature of antmals, could one ever have suspected, that in an animal the brain the heart, the stomach, and all the intestines necessary to life, should reproduce themselves? Could one imagine the existence of an animal, which has neither brain, nor heart, nor veins, nor arteries; which, from the mouth to the opposite extremity of its-body, is but a hollow bag, which appears to be all stomach, all intestine, and whose very arms and legs are stomachs and intestines? Could one form to one's felf an animal that could be ingrafted like a plum-tree, turned infide out like a glove, and produce its young as a stalk shoots its branches? It is not fifty years fince any man who would have hazarded fuch ideas, must have passed for a madman. And yet it is now incontestable, that there are fuch animals, who, not only by

their outward form, but also by their manner of being perpetuated, resemble plants. By this discovery, made in the first half of the present century, natural history has gained a great deal. It may even be faid, that it has enlarged our ideas of the power of God. Since the discovery of animal plants, we have a new proof, that God has diffinguished his works by very small degrees; and that it is almost impossible to determine exactly where the animal kingdom ends, and where the vegetable begins. It is generally believed, that the difference between plants and animals confifts in the former having neither fenfibility nor motion, and the latter having both. That is then the diffinguishing character between plants and animals; but how faint the shade, how slight and almost imperceptible the line which separates the two kingdoms, when we think of the discovery of the zoophites! The feveral species of creatures rife, grow to perfection, and approach one another fo nearly, that the limits, which separate them, can no longer be diftinguished. Throughout all nature we fee fomething of infinity, as the peculiar character of its great Author.

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Eternal Being! who can conceive the immense extent of thy dominion? Who can even know the whole of any single part of it? What wonderful things will be discovered in suture ages, that are now concealed from us! But what

is already visible to us, sufficiently convinces us of thy infinite greatness.

MAY XVI.

THE PLEASURE OF CULTIVATING FIELDS AND GARDENS.

HE culture of fields and gardens is one of the most agreeable employments, and perhaps the only one that is compensated by a thousand pleasures for the trouble it gives. Most works confine men to a room or shop; but he who deyotes himself to country pursuits, is in the open air, and breathes freely upon the magnificent theatre of nature. The blue sky is his canopy, and the earth, enamelled with flowers, is his carpet. The air he breathes is not corrupted by the poisonous vapours of cities. A thousand agreeable objects present themselves to his fight, and, if he has any taste for the beauties of nature, he can never want pure and real pleafures. In the morn, foon as day-break again opens the brilliant scene of the creation, he hastens to enjoy it in his field or garden. The dawn proclaims the near approach of the fun. The grafs springs up again revived, and its points shine with dew-drops, brilliant as diamonds, emeralds, and fapphires. Delightful perfumes, exhaled from herbs and flowers, embalm and refresh him. on every side. The air resounds with the songs of birds, expressive of their joys, their loves, and their happiness. Their concerts are hymns of praise to the Creator, whose blessings they seel, in the agreeable light and heat of the sun, the relish of their food, the sweet instances of

nature, their alacrity and joy.

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Would it be possible, at the fight and sense of fo many pleafing and affecting objects, that the heart should not be touched with delight, with love, and gratitude towards God? Can the mind have a more pleasing employment than that of contemplating and praising his sublime perfections, the greatness of his deligns, and the beauty of his works? What contributes still more to render agriculture and gardening particularly agreeable, is the infinite variety of objects it affords of works and employment, which attach us to it, by constantly affording new ones, and preventing the distaste inseparable from fameness. There are great variety of shrubs, fruits, herbs, and trees, which we plant, and which prefent themselves to us, under a thousand different forms. Nature leads the hufbandman through various paths, and prefents him with numberlefs agreeable changes. Sometimes he fees the plants springing out of the earth; others rising high, and unfolding themfelves; others again in full bloom. Wherever he turns his eyes, he discovers new objects. The heavens above, and the earth beheath, afford him an inexhaustible fund of pleasure and de-

light.

Bless, bless the Lord. Praise his works, and trace him in every field, and through every operation of active nature. It is he who ordains the return of spring, and tells the harvest when to fill with corn the granaries of the righteous and unrighteous man. O! when the soft breath of the zephyrs (emblems of his goodness) comes in spring to cool the air, let us think of him: when, in autumn, the boughs of the trees bend under the weight of his gifts, let us remember him. He crowns the year with his blessings. He is the source of all good.

MAY XVII.

THE TULIP.

OF all the flowers, the tulip has certainly the finest form. There is no silk-mercer who, in the variety and beauty of colours, or the mixture of light and shade, in his silks can approach to the perfection of this flower. The height of the tulip, its form, its colours, its drawing, make it the queen of flowers. And, if we consider that, every year, there blow millions, which all differ from each other, the proportion and beauties of which are infinitely varied, we must have lost all feeling, not to be

Aruck with admiration. Certainly, to be convinced of the existence of a wife and good God, even a tulip is fufficient. Is it possible that such a master-piece of nature could be produced by a blind chance, and without the intervention of an intelligent Cause? It is true that, at prefent, the tulips are produced and perpetuated by roots. But from whence came the first production of this machine, and that first arrangement, of which all the following revolutions are only the consequences? Must we not necessarily admit an intelligent cause, which we call the Creator of the world? It requires as much wifdom and power to create one tulip, from whence ten others proceed, as to create ten of them at once. For the new comers must have existed already in their forerunners; and, it is evident, that their form and number must have been determined. Therefore, when we look at a bed of tulips, let us not limit ourselves to the admiration of their beauty, but let us admire, above all things, the infinite wisdom of God, who has traced the drawing of these flowers, and executed them in fuch perfection. Whatever charms the tulip has it loses a little of its value in being merely for the eye, and having no fweet fmell. When we compare the carnation to it, which, joined to the beauty of its form, has the most exquisite perfume, we soon forget the gaudy dress of the tulip. Such is the fate of persons, who are endowed with beauty, and fet

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off their charms with every ornament, but have neither good fense nor a good heart. It is much more defirable to have fewer outward beauties with an amiable mind: the former captivates but for a very short time, while the beauty of the mind remains, when all the charms of form are fled; and the esteem, which our virtues inspire, is constant and durable. A virtuous soul is pleasing both to God and man. It is formed by the rules of wisdom, and its ornament is innocence. The perfume of good works is fpread around, wherever it exists, and it will one day be transplanted into the garden of Paradife. One observation, which the history of plants affords us, is, that the more beautiful a flower is, the fooner it fades. In a very fhort time, nothing of that blooming tulip will remain but a withered, dead stalk. Its life and beauty last but for a few weeks; age destroys its charms; its leaves fall off; its colours fade: and the tulip (before so like a beautiful virgin) is no longer any thing but a frightful skeleton. What an useful lesson is this for us! See how little we can depend on exterior charms! How uncertain and frail is beauty! how near we are to death! for what is our life but the life of a flower? We sometimes resemble it in beauty, but we resemble it likewise in the shortness of our days; for, "Man, that is born of a woman, is of few days, and full of trouble. He

"He cometh forth like a flower, and is cut down." Let us so live, that, when that time comes, the good may regret us, and weep over our graves.

MAY XVIII.

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REFLECTIONS ON GRASS.

HOWEVER beautiful the flowers may be, which are cultivated in gardens, through the care and industry of man, we should know but little of the wonders of the vegetable kingdom, were we to limit our researches to the contemplation of a flower-garden. Each field is a scene of the wonderful works of God, and has as much right to our observation as the most improved garden. In the first place, can any thing be more astonishing than the prodigious quantity of grass in a field! Suppose that a field was no more than a thousand paces long, and of equal breadth, its surface would be a million of feet square: now, if we suppose that, in making a step, we cover only ten blades of grass, there must be, in each fquare pace, a hundred of these blades of grass; consequently, in casting a glance on that field, we fee at once a hundred million of those machines fo curiously formed. Let us give to each blade of grass but a hundred veins, by Vol. II.

means of which it draws nourishment from the earth, there would be, by this account, ten thoufand millions of regular and perfect veins. But who can suppose, that it would require only a hundred veins for its nourishment and growth, when each blade of grass is a series of nothing else? How immense a multitude of them must there be in the field! and how fmall in comparifon is the number of plants and flowers which grow and are cultivated in gardens? Why has the Creator fo prodigiously multiplied the productions of the vegetable kingdom? Why, from each fort of grafs, does he cause to spring such a numerous multitude? It is, undoubtedly, that beafts as well as men may find fustenance. The fields are, properly speaking, the magazines for animals. Another circumstance worthy of observation, in respect to grass, is, that it neither requires fowing nor tillage, but grows perpetually, independent of our care. How fad and barren would our pastures and meadows be, if we were loaded with the care of fowing the grassfeed, and of afterwards watering what our hands had fowed and planted! But, at the creation of the world, God so provided, that a sufficient quantity of grafs should never fail. From that almighty word of the Creator (" Let the earth "bring forth grass, the herb yielding feed,") proceeds the constant fertility of our fields. To reflect on the colour chosen for the grass, is fufficient to make us fensible of the wife and beneficent care of the Creator. If all those fields were red or white, who could long bear the dazzling fight of it? If the predominant colour were darker and more gloomy, what a melancholy appearance would all nature have! The green is between both colours; it agrees with our eyes, and, far from offending or tiring, it pleases and refreshes them. It is also very remarkable that, in this fingle colour, there are fuch variety of shades, that there is not a plant the green of which is exactly as pale or as deep as that of another. It is evident that, in the arrangement of the vegetable kingdom, God has not provided less for our pleasure than for our convenience. This double attention is well calculated to convince us of that supreme goodness and wisdom which extends over the whole earth. May the proofs of it, which daily prefent themselves to our fight, never make us cold or indifferent to it : on the contrary, let us employ that reason, which we owe to God, in making ourselves, through all his works, acquainted with that infinitely wife and merciful Being. Later to the autition for the courte

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M A Y XIX.

SENTIMENTS WHICH THE CONTEMPLATION OF THE SKY EXCITES.

W HAT but a spirit of unlimited knowledge and power could form that fuperb vault over our heads! who could have given motion to those immense globes; that perpetual motion, whose swiftness is inexpressible; a motion which even the smallest grain of fand could not have of itself! Who ordered those enormous masses of heavy and lifeless matter to take so many different forms? From whence proceeded that connection, that beauty, and harmony, which thines through every part of the whole? Who regulated all things fo exactly, according to number, weight, and measure? Who prescribed to those immense bodies such laws as none could discover, but minds endowed with the greatest wisdom? Who measured those vast circles, in which the stars move, without going out of one line? Who put them into the course they run, and which they are to run without interruption? All these questions lead us to thee, thou adorable Creator'! Self-exifting, independent, and eternal Being! it is to thee the celestial bodies owe their existence, their laws, their arrangement, their power, and all the advantages they procure to the earth. What fublime ideas must

rife in our fouls, when we think of thefe great objects! If the space, in which so many millions of worlds move, cannot be meafured by our understanding; if the globes, which run their prodigious courses there, are of a fize to astonish us; if the fabric of the universe, constructed by the Creator, is of fuch immensity that our ideas are lost in it; what must thy greatness be, O God! and what understanding is able to conceive it! If the heavens and all their host have fo much magnificence, beauty, and majesty, that the eye can never be fatisfied with contemplating, nor the mind with admiring them, what must be thy beauty, thou eternal Being, of whose splendor and glory these creatures are but faint and imperfect images! What must be the incomprehenfible extent of thy knowledge and understanding, fince thou seest with one glance the whole immense space, all the numberless bodies in it, and art so intimately acquainted with the nature and properties of all the beings thou hast placed there? What depths of wisdom and knowledge must be in thee, O Lord! who haft formed fuch admirable plans! how great must thy power be, to be able to guide and direct, according to thy will, the most immense bodies! to animate all by thy breath! and to preferve all by thy almighty word!

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MAY XX.

FRUITFULNESS OF PLANTS.

HE magnificence of the earthly creation shines in nothing more than in the astonishing fertility of plants. One fingle one can produce thousands, even millions of others. One tobacco plant may yield forty thousand three hundred and twenty grains of feed ! and, if we calculate in proportion, the produce of four years, we shall find that from one fingle grain, there may fpring two millions fix hundred and forty-two thousand nine hundred and eight billions, two hundred and ninery-three thousand three hundred and fixty-five millions, and feven hundred and fixty thousand grains of feed. An elm, twelve years old, has often five hundred thousand grains of feed: what a prodigious number would that produce in a few years! Suppose the tree had but a hundred thousand buds? and that the shoot of each year contains but five of them, there would be every year five hundred thousand plants, which may be considered as new. If we add to that, what is produced by the increase of the root, by ingrafting, &c. we shall only be furprifed, that the earth has not yet been confumed by plants. But we must remember the numerous multitude of animals, who owe their food to the vegetable kingdom. They annually confume fo great a quantity of

plants, that if nature had not endowed vegetables with very extraordinary prolific qualities, there would be reason to fear their total destruction. But whilst animals are destroying them, they often propagate them at the same time. The birds eat the fruit, but they restore the kernels, just as they swallowed them, without hurting them in the leaft. While they confume certain forts of fruit, they scatter the feed about, and often to a great distance. This dispersion is necessary, in order that one only fort of plant should not fill a whole field. It is with the fame delign that some seeds have little feathers. or wings, to be difperfed about by the windle It is certain also, that, in general, the plants are more fruitful than animals. This may be proved, by comparing trees with four-footed animals: the former produce, annually, formetimes for feveral ages, a great number of new trees; whereas the greatest quadrupeds, such as the elephant, the mare, &c. have but one, or at most two young ones, and are often barren. The leffer quadrupeds, fuch as the dog, the cat, the rat, &c. are much more fruitful, but still not to be compared to the fertility of trees. Fish and infects approach nearer to it: tench lay about ten thousand eggs, carp twenty thoufand, and cod a million. Now, compare that fruitfulness to the wild rose, mustard, or fern, and it will be found that those plants, and many others, multiply much more than either fifth or

infects; particularly if it is observed, that almost all plants multiply in several ways; whereas most animals have but one way of propagating. A tree may produce as many new trees, as it has

branches, boughs, and even leaves.

With what wisdom, therefore, has God proportioned the animal and vegetable kingdoms. If the multiplication of vegetables were less confiderable, a great number of animals would die of hunger; our fields, our meadows, and gardens would be desarts, with only some few plants scattered here and there. On the other hand, if the Creator had ordained that the granivorous animals should increase more than the plants, the vegetable kingdom would soon be exhausted, and several species of animals would be at an end. But, according to the relation between the two kingdoms, the inhabitants of both multiply in proportion, so that no species should perish.

Thus, O man, abundance and pleasure surrounds thee on every side; for it is for thee that the Creator has made the vegetables so astonishingly fruitful: it is for thy support, thy pleasure, and thy health, that he has produced such variety of plants, and in such great abundance. Count, if you can, what covers one single field; their number is inconceivable; and this innumerable multitude is an image of the immensity and omnipotence of the Lord; who, through-

out all nature, "openeth his hand, and fill-"eth all things living with plenteoufnefs."

MAY XXI.

Description of the Beauties of Spring.

NOTHING is more worthy of admiration than the revolutions which spring occasions upon our globe. In autumn, every valley, field, and forest presents us with the image of death; and, in winter, nature is deprived of every ornament. All the animals are melancholy; the inhabitants of the forests conceal themselves, and are filent; the earth becomes a vast solitude, a defart, a grave; and nature appears to be fallen into a state of lethargy and infensibility. In the mean time she filently labours for us, whilst we, alas! forget the secret influence of divine Power, preparing the renewal of nature. All that appeared dead is again animated. In the trees alone, what endless changes take place! First, the fap (which, in winter, had entirely forfaken the trunk and branches) rifes flowly up its invifible channels, and particularly in the bark, through ways which can only be gueffed at, and not discovered. This sap serves to swell the buds: what treasures of the divine Power are contained in those little recesses! the leaves,

with their cheerful green; the boughs which pierce between leaves when opened; new buds upon those boughs, full of leaves, though still invisible; then, that multitude of blossoms, with the fweet exhalations which embalm the air; in those blossoms fruit; and, in the fruit, the feed of an infinite number of other trees. The cheerful light of the fun transports and animates the foul, and the activity of nature, in the plants around us, charms the fight. There is not a field, which does not prefent a beautiful landscape to the eye, and flowers to the smell. Almost every bird fings its hymn with more or How cheerful the fong of the less melody. linnet, hopping from branch to branch. throws out its voice, as if it had formed the defign of particularly drawing the attention of man, to delight him. 'The sprightly lark rises in the air, and feems to falute the day with its fhrill note. The cattle, by their cries, express the spirit and joy with which they are animated. In the rivers, we fee the fish (which, during winter, had fallen, frozen and motionless to the bottom of the water,) now rifing near the furface. They have recovered their former vivacity, and their pliant, gentle, pleafing motions, amuse our fight. How can we so often behold those objects, and not continually feel the most profound and respectful admiration of that eternal Being, whose power so gloriously manifests itself! Never ought we to breathe the pure and

refreshing air of spring, without recollecting that it is God, who clothes the woods and meads with that beautiful verdure, so pleasing to the sight; God who gives life and happiness to every creature; God, through whom we have our existence, and enjoy the sweets of spring.

MAY XXII.

THE LANGUAGE OF ANIMALS.

AN, properly speaking, is the only animal who can be faid to have language; and it is particularly by this circumstance, that he shews his fuperiority over all other animated beings. It is by means of speech that he extends his empire over all nature; that he rifes towards his divine Author; contemplates, adores, and obeys him. It is from thence that he learns to know himself, and the creatures around him; and to make them ferve for his use. Every animal but man is deprived of that faculty, because they are void of reason; and it is reason which capacitates us to learn languages, and the use of fpeech. But as animals make their wants and feelings known by natural figns; as they utter certain founds which express the sentiment which affects them, one may fo far allow they have a fort of language. The variety of those tones,

their number, their use, and the order in which they follow one another, form the effential part of animal language. To form a just idea of it, it is not necessary to have recourse to deep refearches: it is enough to observe the animals daily before our eyes, and with whom we have a fort of intimate connection. Examine the hen with her chickens: if she finds any food, she calls and invites them to it. They understand her, and come instantly. If they have loft fight of this tender mother, their plaintive cries express their anguish, and defire to see her again. Attend to the different cries of the cock, when a stranger or dog comes into the poultry yard, when a kite, or any other enemy appears, and when he calls or answers his hens. What do those lamentable cries of the turkey mean? See her chickens all on a fudden concealing themselves, and lying so quiet, one would say they were dead. The mother looks up to the fky, and her anxiety increases; but what is it she sees there? A black fpeck, which we can scarce distinguish; and this speck is a bird of prey, which could not escape the vigilant and piercing eyes of this mother. The bird of prey disappears. The hen gives a scream of joy. Her anxiety is at end. The chickens revive, and gather again about their mother. There is fuch variety in the language of the dog, it is fo rich and fruitful, that it would be enough by itself to fill a dictionary. Who can be infensible to the joy

that this faithful servant shews at the return of his master. He jumps, he dances, he runs here and there, turns quick and lightly round his master; stops all at once; fixes his eyes upon him, with the greatest tenderness; draws near him; licks and careffes him feveral times. Then, beginning his play again, he disappears and returns dragging fomething after him of his, puts himself into all forts of pretty attitudes; barks; tells every body how happy he is; and shews his joy in a thousand ways. But how different are these sounds from the noises he makes at the found of a robber, or those he makes on seeing a wolf. If we follow a dog in the chace, we fee how he makes himfelf understood, by all his motions, and particularly with his tail. How well adapted his figns are to the discoveries he wishes to make! This affords us an opportunity to admire the wisdom and goodness of the fupreme Being. What beneficent attention he has shewn towards animals, in granting them. the power to express by founds their wants and feelings! From their organization, and the nature of their foul, it was impossible they should fpeak the human language; but they would have been much more to be pitied, and less useful to us, if the Creator had entirely deprived them of the power of making themselves understood. To compensate them for the want of speech, he endowed them with address to communicate by a thousand little ways, their feelings to one

another, as well as to mankind. He has given them organs, proper to produce and vary a certain number of founds, by which each species make themselves understood. From thence it is, that when we blow into the windpipe of a dead sheep, or cock, we might imagine we heard the animal itself. In a word, the Creator has given as much force to the language of animals, as their nature would admit of; and all that the end for which they were created required. How perfect man appears in regard to fpeech! The language of animals confifts only in a number of inarticulate and imperfect founds. They have no ideas but those prompted by their senses! because they are incapable of learning a methodical language. They only know objects by fome qualities evident to the senses, to which all their judgments and comparifons are limited. As for us, we possess faculties in all respects much fuperior. We can rife to general notions, and feparate the object from the qualities which diftinguish it. We can, by means of an infinity of founds, (articulate and arbitrary,) express all our conceptions. We can learn the connections which unite us to other beings, act in confequence, and thus enfure our happiness.

Can we ever reflect on this important bleffing without gratitude to our merciful Creator!

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MAY XXIII.

THE GREATNESS AND NUMBER OF THE CREATURES ON THE EARTH.

LORD, how great and numerous are thy works! We must acknowledge this if we only knew those which the earth contains; for how great is the extent of this globe, the abode of fo many different nations! They occupy vaft domains, and yet how many folitudes and defarts are there, which have never been inhabited by man! Neither does the land (taken in the whole,) fill near fo great a fpace as the fea, that prodigious element. But if the earth in itself is a proof of the greatness of the Almighty's works, we cannot cast our eyes on the creatures it contains, without admiring the number and variety of them. In the first place, we find innumerable forts of stones, minerals, and metals concealed in the earth; then, what aftonishing variety amongst the trees, the plants, the fruit, and fimples which cover its furface. Notwithflanding all the pains that has been taken to observe and class the different forts of vegetables, it has never been compassed, nor will all the future efforts of naturalists arrive at it. Let us next confider the living creatures. What extreme variety of them there are between the eagle and the gnat, the whale and the gudgeon,

the elephant and the mouse? The disproportion is prodigious, and yet the whole space between them is filled with living creatures. The animal species come so near one another, that it is sometimes difficult to distinguish one from the other; yet that species is so multiplied, that from the gnat to the elephant they form a fort of chain, in which each link holds by the preceding one. In feas, lakes, and rivers, on the furface and in the bosom of the earth, there is no place which some way or other does not contain a living creature. Yet however great the number may appear of these creatures visible to the naked eye, they cannot be compared to the number of those which are too small to be seen without a glass. By the help of the microscope, almost imcredible discoveries have been made, of which however all who have the opportunity, may be convinced with their own eyes. There, in some measure, a new world presents itself which was before utterly unknown to us. There fuch living creatures are feen, that imagination itself can scarce form any thing so extremely small, fince one of them is not near so large as the millionth part of a grain of fand. And it is not only their number and variety, it is also the beauty and delicacy of their form which ought to strike us with astonishment. What appears dull to the naked eye, or even what efcapes it entirely, if it is feen through the microfcope, has an inconceivable luftre and delicacy.

Gildings, which art cannot imitate, shine in the fmallest grain of fand, but particularly in certain insects' limbs; for example, on the head and in the eyes of a little fly. And in the construction of the lowest of living creatures, their exact fymmetry and admirable order are observable. We find, in a word, that millions of creatures, fo small that the eye can scarce distinguish them but by the help of a glass, have, notwithstanding, as perfect an organization in their species, and are as proper to fill the feveral purposes of the Creator as the greatest animals, with which the earth is peopled. Such confiderations must give us a lively fense of our own littleness. I lose myself in this innumerable multitude of God's creatures, who would be sufficient to witness his greatness, though I, and millions such as I, had never existed .- In every element there are beings created and preferved: each grain of fand is a dwelling for infects, which are also in the class of God's creatures, and are links of the immeasurable chain. Here my ideas are lost in infinity: the more we reflect on the greatness and variety of his works, the more we feel the limits of our understanding. We have only to admire and adore.

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MAY XXIV.

Spring is an Emblem of the Frailty of Human Life, and an Image of Death.

come shipmank, her common t AT this feafon we need not go far to feek images of frailty and death: they prefent themfelves on all fides; being connected with almost every beauty of nature. Undoubtedly, the Creator's defign, in this respect, was to remind us of the uncertainty of things of this world, and to reprefs the dangerous propenfity we have to place our affections on objects fo vain as all those in nature. Spring is the season in which the plants receive a new life, and, at the fame time, that in which most of them perish. As ferene as the days in fpring are, fo fuddenly are they obscured by clouds, rain, and tempest. Sometimes the morn appears in all the luftre of its charms; then, before mid-day, its fplendor, which had flattered us with the hope of fine weather, difappears. Sometimes, alfo, this hope is fulfilled, and the days of spring shine in full beauty. But how transient are those ferene days! how swiftly they pass away! they vanish, even before we have well enjoyed them. It is thus, that the best of our life (which is so often compared to the spring of nature) flies away. Often, in the morning, every thing smiles upon us, every thing promises us joy and happiness;

but, before evening, before noon even, we meet vexations, and flied tears of forrow. Let us look back on those days of our youth, which we may call the fpring of life: how faort have been the joys of our youth! how great the variety of pleasures we enjoyed! But, where are now those happy moments, those ravishing delights! What is become of that constant fprightliness, and those roses of youth, which were feen in our cheeks! We no longer have a tafte for those turbulent pleasures which then intoxicated us. What now remains of those fine days that are past? Nothing but a melancholy semembrance, unless we have made good use of them. With what force the spring points out to us the frailty and end of life! Behold how far its charms extend! behold the trees full of bloffoms! But let us not too much exult in their rich ornaments: mortly, they will return to that dust from whence they came. All that thowy generation must die in the fame fpring which gave them birth. It is thus that our lives vanish. Its longest duration is but as a day in foring. An unforeseen death hurries us to our graves, whilst the health and strength we enjoyed promifed us a long course of years. Sickness and death often come upon us so much the more unexpectedly, as their approach is concealed under an appearance of youth and health. Let every one behold an image of himself in the fpring bloffoms, and there read his own uncertain state; how transient is their bloom! what a picture! how instructive!

Though these thoughts ought to render us ferious, yet should we enjoy both the spring of nature, and the pleasures of life, as they are bestowed upon us by the Creator; but, at the fame time, let us mix reflections with these enjoyments which arise from the nature of spring and life. The thought of death is very confiftent with every innocent pleasure. Far from infusing melancholy in our hearts, it should teach us to rejoice evermore in the Lord; it should guard us against making a bad use of earthly pleasures; it should inspire us with a defire of folid and uninterrupted happiness. The beauties of the visible world give us an idea what must be the infinite beauty of the invisible and heavenly world; and, finally, when the time comes, in which our lives must wither and fade away as the grass of the field, then may we say, with Christian fortitude: though my life, like a spring flower, wither and turn to dust; though these cheeks, wherein the roses of youth shine, be a prey to corruption; I still hope for a better life, which I shall never lose; and the body, in which I shall then be cloathed, will never de-Color of the first of the Color of the Color

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M A Y XXV.

Spring is an Emblem of the Resurrec-

MOST of the flowers we admire were once coarfe and shapeless roots, but now they adorn the earth and charm our fight. What a fine image this is of the refurrection of the righteous, and the state of their bodies re-animated! As the roots of the most lovely flowers, while buried in the earth, are shapeless and without beauty, but when in bloom have a thousand charms; fo is the human body; while in the grave, it is an object of horror, but at the refurrection it will experience a most astonishing change: " for what is fown in corruption is " raised in incorruption; what is sown in dis-"honour is raifed in glory." As foon as spring takes place of winter, life and joy take place of the melancholy impressions which a severe seafon makes on the mind of man; and the first fine days make us forget the long winter and its darkness. Thus shall we forget, at the great day of the refurrection, all the fad and gloomy days of our past life. The clouds of affliction in this world cast a gloom upon our countenance; but as foon as the light of a new creation dawns upon us, grief is no more; nothing more can disturb the serenity of our souls; a heavenly joy possesses us entirely.

Spring is the general renewal of the whole earth. As dull as it was to us in winter, it is now no less pleasing and beautiful in its appear-Every thing enchants and delights us; and we might almost fancy ourselves every spring transported to some new and cheerful habitation. It is thus that, at the day of refurrection, we shall find ourselves transported into a new or magnificent dwelling. The new heaven and the new earth will be free from all the apparent or real defects of the globe which we now inhabit. Peace, order, beauty, and righteoufness will make our future abode the happiest that is possible to be conceived. When the warm rays of the fun have penetrated into the earth, millions of plants and different forts of flowers fpring out of its bosom. It will be the same in that great day, when generations will rife out of the dust in which they were buried. As the spring-flower rises from its feed to the height of bloom and beauty; fo will our bodies, deposited in the grave, rife one day in full glory, clothed with celeftial beauty. Spring is the æra of vegetation for grass, flowers, and plants: it is then that every thing which has fprung up out of the earth opens every day more and more, and grows visibly. So will the day of refurrection be the ara for the unlimited progress which our immortal fouls will make in all that is good. No weakness will there stop us in the road to perfection. We shall rife from virtue

to wirtue, from felicity to felicity. In spring all nature seems roused from sleep to praise its author. Like songs of joy will be chaunted at the day of resurrection by the elect of God. We may judge of the great by the lesser. If the earthly spring is so rich in enjoyments, what will be those in the kingdom of heaven!

MAY XXVI.

THE ATTRACTIVE POWER OF BODIES.

E often see two bodies draw near to one another, without being pushed together by any exterior force. The motion which produceth this effect is called attraction or gravitation. This power of attraction proves to be one of the principal springs of nature. It is by means of this law, that fluid bodies rife up into the capillary vessels; and it is partly the cause of the circulation of the juices in plants, and even in animals. It is true that the power of expansion in the air contributes its share to it, at least in plants; for there is a portion of air amongst the fluid which nourishes them. Vegetables are also provided with veins which suck in the outward air, and at the same time help to draw up the juices: however, attraction is certainly one of the chief causes of the phenomenon. No one is ignorant that the human body is a feries

of numberless capillary vessels, where the humours are continually in motion; and this motion is partly regulated by the laws of attraction. A great number of the phenomena we observe in the corporeal world have this attractive power for principle; and it is the most satisfactory way of accounting for the motion of the celestial bodies. These enormous globes separated from each other at fuch immense distances, must be united by some secret connection, to form such a whole as our folar fystem. And it is probable that the union of the celestial bodies, their direction, the law which obliges them not to deviate from the course prescribed them, the motion of the planets and comets round the fun, all depend on its attractive powers, and on the gravitation of the bodies which incline towards it. How admirable is that wisdom which, by means of one and the same law, produces the vegetation of a blade of grass, and the motion of all the whole fystem of worlds!

These reflections naturally lead us to adore the supreme wisdom. If it appears in the celestial bodies, it is no less visible in the government of rational creatures. The Creator acts, in this respect, upon principles equally wise, according to the same laws, and all with the most wonderful simplicity. But, blind as we are, we are not always sensible of it, because we do not think any thing worth our attention that is not strikingly great. But why should we not see in the

things which appear to us of little importance. the traces of wisdom so evidently impressed upon them. When cities and countries are fwallowed up by earthquakes, laid waste by fire or water, we become attentive: we then fee that fuch revolutions are the work of the Master of the universe; and his wise providence is acknowledged. But it is only extraordinary events, which ought to bring to our mind the wisdom and justice of God? Does not the greatness of the fupreme Being appear as much in the smallest blade of grass, and in the poorest insect, as in the motion and harmony of the fpheres? Yes, in the small as well as in the great, God manifests the glory of his attributes. It is from our inattention and negligence, that do not every where fee it, even in the smallest beings, and most trifling events. To be convinced of the wisdom and goodness which presides in the government of Providence, we need not go to remote objects; we need only dwell on what relates to ourselves, and to the particular dispensations of God in this respect. Our own lives, and the events with which they are marked, may teach us how wife the means he has chosen to make us happy; how many little circumstances his providence has made to concur towards the execution of his defigns; and how numerous the means he makes use of to preserve us from evils, or to prepare us bleffings. Vol. II.

M A Y XXVII.

Complaints of Mankind, relative to certain Inconveniencies in the Laws of Nature.

WHY is the human body, from its consti-"tution, liable to fo many infirmities and acci-"dents?" Whoever asks this question, let him fay, how is it possible to form a body which unites more advantages in itself than that which we have received from our Creator? It was incompatible with nature, and the chain of things of this world, that man should have an invulnerable body. If one of our fellow creatures is deformed, another lame, a third deaf or dumb, is it a reason to murmur against God? those defects so common as to give us reason to complain? If, after these questions, any one should still think they have reason for discontent, let them reflect on the following truths: It is of use to men, in general, that they may not want examples of the defects to which the human body is liable; for, when a person, perfect and well made, compares himself with one that is crooked and deformed, he is fenfible of all the advantages of well-formed limbs; he learns to value properly a gift till then unthought of, and to take more care to preferve it. How valuable is each eye, each ear, each organ of fense, each joint, each limb, if we only ob-

ferve the condition of the few people who are deprived of them! Would any of us part with a limb, in exchange for the greatest treasure? Are not our bodies more beautiful and regular than the finest building, or the most curious machine? And though the latter are very inferior to it, we are far from attributing the affemblage of their parts to chance. "Why are the " countries of the earth fo different from one "another, fometimes cold, fometimes damp, "fometimes low, and fometimes high?" But, O man, if thou hadft the power to form a globe, wherein every thing was to be for the advantage of men and animals, would thy understanding furnish thee with a plan better than this? The countries of the earth, by means of their difference, produce variety of exhalations and winds, which occasion that mixed air, wherein experience tells us, that men and animals live healthy and content in most places, and wherein plants also grow and propagate. "It is, how-" ever allowed that the variation in weather is " not beneficial to all men, or to all countries." But, has not the preceding weather influenced the following, as the climate of one country often influences another. Are we capable of judging of the whole? must a million of farmers figh in vain for rain, because dry weather would fuit the private convenience of one family? A certain temperature of the air may occasion, here and there, a transient barrenness, but, can

it be called an evil, if it was necessary in order to hinder the air from corrupting? The east wind, favourable to a whole country, ought it to ceafe to blow, because its violence may cause some shipwrecks, or be hurtful to some consumptive people? Is it reasonable, when we cannot take in the whole, to find fault with part? " Why " are there so many hurtful animals?" Would it then be better to have no beafts of prey, small or large, upon the earth? It is precifely those which put a stop to the number of animals, that might overpower us! and, it is because many animals ferve for food to beafts of prey, that the numbers of living creatures increase every year. If these beasts of prey did not exist, the carcases of animals on which they feed, would not only be useless to living creatures, but would be hurtful. Every year, animals thus devoured are replaced by others; and, in most cases, population depends on the quantity of sustenance. Thus, gnats, and other infects would foon want food, if the animals, whose prey they are, did not prevent them from multiplying too fast. "Why has the Creator regulated the course of " nature by fuch invariable laws? It is precifely by means of this regulation, that man's experience and labour enable him to make use of his understanding and powers, so as to be, in fome measure, master of his own welfare. Would we chuse to inhabit a world, where, when we were hungry, we had only to wish,

and we should be satisfied; where our cloaths should fall from the clouds, if, when travelling in a cold night, we neglected providing any? Or would we at pleafure walk fometimes on the ground, fometimes in the water, fometimes in the air; a world where the stomach should never be overloaded with the weight of food; where an iron hatchet would fwim, if by accident we let it fall in the water; where bodies going out of their natural direction should describe an oblique line, lest their fall should hurt any body? Would we wish to inhabit a world, where we should have no occasion to do any thing; where we could not in any way promote our own pleasures; where there should be no rule, no fundamental law; where, in fine, the best, the bad, and the worst being equally unknown, nothing could make us attend to the laws of nature?

Doubtless, there will ever a number of things in nature, the purposes of which, or their relation with the whole, must ever be concealed from us. We shall always find some which, to our limited understandings, will appear contradictory, and ill adapted to the plan of the Deity. But, on all occasions, let us rest on this principle, that God does every thing for wise and beneficent purposes. And, when these enigmas, these inexplicable things, present themselves, let us say with the apostle, "O! the depth of the riches, both of the wisdom and knowledge

" of God! How unsearchable are his judgments, and his ways past finding out."

MAY XXVIII.

SINS WE ARE APT TO COMMIT IN SPRING.

Is it possible that we can profane, by fin, this feafon fo peculiarly formed to prompt us to the practice of piety? Would it not be natural to fuppose that, in spring, each field would be to us as a temple, where we should offer up to our Creator endless facrifice of praise and thanksgiving; where each thought, each fentiment, and action, should tend to his glory? But alas! we daily fee the ingratitude of man towards his heavenly Benefactor. We behold nature renewed, we behold the flowers, and a thousand other delightful objects, without thinking of him who made them all. This is the reigning vice of the feason, and is, at the same time, the source of all the faults committed in it. Man is the only creature on earth insensible to his own happiness; and yet he has the faculty of feeling it to its utmost extent. This is addressed to the ungrateful and infenfible heart; but what attention can be expected from those who pay so little to God, who speaks throughout all nature in a voice fo intelligible and ftrong! Yet, how is it

possible to forget our Creator! All his works proclaim him, and we can neither know ourfelves, nor the world we live in, without knowing him. Each creature reminds us of its Maker; each part of the vast scene of nature is filled with the Deity. He shews himself in each blade of grass, each flower, and bird. He constantly borrows the mild and persuasive language of nature, and addresses himself to our fenses, our reason, our conscience, and all our faculties. Let us only listen to their language, and we shall no longer be insensible or ungrateful. How ought we to employ these days? Let us breathe the wholesome air, and walk in the fields and gardens, in order to contemplate the beauties of the feafon; but let us take care not to make a bad use of them, by giving way to extravagant pleasures, which lead to folly and repentance. We shall not be able truly to enjoy the fine feafon of spring, till, by fixing our attention on the works of our Creator, we difcover from reason his divine goodness and power. Then will our hearts experience joys, much fuperior to the pleasures of those who forget their Maker. It is for fuch only that we are endowed with reason and sensibility. On the other hand, let us turn to those who, at this season of the year, give way to too much care and anxiety. When, in the depth of winter, and oppressed with many wants, they grow anxious and melancholy, then they may deferve fome indulgence; but, at this time, it is an unpardonable doubt of Providence. Behold the lilies of the field, how they grow; confider the fowls of the air, they fow not, neither do they reap, yet your heavenly Father feedeth them. Spring is the feason of hope. Give it admission to your hearts. Let the pleasures, which nature now lavishes upon us, lead us to rejoice in the inestimable advantage we have over so many millions of living creatures, of knowing God to be the author of all happiness.

MAY XXIX.

THE HARMONY AND PATRIOTISM AMONGST THE BEES.

UNION and patriotism form undoubtedly the fundamental happiness, which may, in some measure, be ascribed to bees. It is at least certain, that their colony would soon be destroyed, if they did not live in a fort of harmony amongst themselves. Those who have made observations on this subject inform us, that when these slies return to their hive, loaded with materials for building, they find some of their companions ready to relieve them from their burden. The travellers begin their journies again; and, while they are gathering more provision, the work

people who remained in the hive, knead together the little the others had brought; and thus prepare a mass proper for the building. Some who are not directly employed in work are bufy in good offices to the work people, and bring them food, in order to let the work go on without their losing by it. This harmony nearly approaches to the patriotism observable amongst The riches of a nation are the riches of each citizen; and this numerous colony forms but one family. Here there is no felf-interest, no avarice, and confequently no rapine. Here the bees never affemble together to use violence, and fight battles with their country people. Here we never fee one bee ambitiously wishing for more than necessary, whilst another is in want: neither do they ever try to get more honey when they have laid in a fufficient provision for the winter.

Infignificant as we reckon these insects, we may learn from them virtues on which depend the repose and happiness of our lives! In whatever rank or condition we are, it is necessary to act in concert with our fellow-creatures as patriots. The society in which we live, Christianity, and our own happiness require it. Let each of us cheerfully bear our part in the general burden; and if it is necessary, let us even take upon us the burden of others, when through ignorance or weakness any may be descient. And if it should so happen, that religion, duty, and con-

science required us to make great sacrifices to our fellow-creatures, let us take care not to confider it as an evil, but let as rather think it an honour to be able to fucceed better than them. Let no vile selfishness ever find room in our hearts. Those who feek to enrich themfelves at the expence of others, are contemptible members of fociety. When we can in any way contribute to the general good, let us not be deterred from it by the fear of having no reward are not the testimony of a clear confcience, and the bleffings of eternity fufficient rewards? It is too true, however, that amongst the evils of this life, which we form to ourselves, we must reckon this as one, that there is no fuch thing as perfect agreement in fentiments. and characters: but, even this ought to make us admire the wifdom of Providence, which notwithstanding the disunion and disorders in the world, notwithstanding the felf-interest which governs mankind, fill keeps up fociety and makes it flourish. When a pilot knows how to direct his ship, fo as to avoid the fandbanks against which it was drove by the waves, it is then that I admire his skill and experience. And when I fee, notwithstanding the wickedness of mankind, in the midst of the storms of passion, that wisdom and virtue still preside, I admire the infinite wildom of him who governs the world.

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MAYTXXX. of the form

THE PRODICIOUS NUMBER OF PLANTS ON THE EARTH.

ABOVE twenty thousand different forts of plants have been already reckoned, and we difcover new ones every day. Some have been found out by the help of the microscope, where it was least expected. Mosses and spunges have been claffed among vegetables, and have difcovered to the virtuofi flowers and feeds unknown before. Freestone is often covered with brown dark spots, and the same is seen on the best polished glass. This mouldy substance sticks to most bodies, and it is a garden in a miniature, a field or a forest, where plants have their seeds, which bloffom vifibly notwithstanding their extreme littleness. If we reflect on the quantity of moss which covers even the hardest stones, and the most barren spots; on the quantity of herbs and grass; on the several forts of flowers; on all the trees and bushes, each of which may be confidered as an affemblage of a thoufand different vegetables; if we add to thefe, the aquatic plants, as flight and delicate as a hair, and most of which are still unknown to us, we may, in some measure, form to ourselves an idea of the multitude of plants upon our globe. It is more wonderful how all these different forts

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of plants are preserved without destroying one another. In order to prevent this, the fovereign Disposer of all things has appointed to each species of vegetable a place analogous to its peculiar qualities. He has distributed them upon the furface of the earth with fo much wisdom, that no part of it is destitute, nor do they grow in too much abundance any where. This is the reason that some plants require growing in an open field, and not in the shade, where they would at least grow languid and weak. Others can only fubfift in water, where the different qualities of the fluid matter occasions great variety. Some plants grow in fand, others in marshy and muddy places. Certain vegetables fpring above the furface of the earth, others unfold themselves within its bosom. The different ftrata of which the foil is composed, fand, clay, chalk, &c. have each their particular vegetables; and from thence it is, that in the immense garden of nature there is no place absolutely barren. From the fmallest dust to the hardest rock. from the torrid to the frigid zone, every foil, every climate, has its peculiar plants. Let us observe another circumstance well worth our admiration. of the Creator's having fo ordained, that amongst this great number of plants, those we use for food or medicine, either for ourselves or animals, increase much more abundantly than those of less nfe.

Herbs, both in species and individuals, are much more numerous than bushes and trees. There is more herbage than oaks, more cherry trees than apricots, more vines than rose trees. It is evident, that the Creator, in this arrangement, designed it for the general good. To be convinced of it, let us suppose the contrary had been: if there were more oaks than pasture, more trees than herbs and roots, how difficult would it have been for animals to subsist, and how many charms would the earth be deprived of!

Almighty, and most merciful Being! in this also does thy wondrous providence appear. It requires no effort of the mind to comprehend that thou art great and good, we need only contemplate thee in the immense world of plants.

MAY XXXI.

PLURALITY OF WORLDS.

IT is not through ignorance alone, it is more through felf-love and pride, that we call nothing the world but one of the least parts of the universe; persuading ourselves that our globe alone is peopled; that the sun was made merely to communicate its light and heat to us, and that the moon and stars are of no other use but to

light our nights, and shew the traveller his way. The contemplation of the fixed stars is sufficient to contradict this ridiculous opinion. Their twinkling proves that they shine with their own light; and their being visible to us at the immense distance they are from us, proves that they are much larger than the fun: It is then probable, that these celestial bodies, which are not luminous specks, but great suns; these numberless bodies placed so far from our globe, that they should not be created for better purposes? If their purpose was only to serve as nocturnal lights to us, they would be of no use the greatest part of the year. The frequent cloudy skies and the nights that are light from other causes, would make them useless. Those stars also, which the naked eye cannot discover, from their great distance, would be absolutely of no use; and the purpose ascribed to them would be better supplied by one fingle flar nearer to us, than by fo many millions at that diftance. As the fame reafoning may be applied to every use the stars are of to us, either in navigating or any thing else, it must be allowed, that we could not possibly account for the defign of those numerous funs, if no creatures except those of our own globe profited by their light and heat, or unless they themselves served as habitations for different be-This conclusion will appear still more natural, if we reflect attentively on our folar fystem. We have already observed, that the

moon in many things refembles this earth-That there, as well as here, land and fea, mountains and vallies, islands and gulphs, are to be feen. Such affinities as thefe authorife us to admit others, and to suppose also in the moon, minerals, plants, animals, and rational creatures. The analogy between the moon and the rest of the planets, leads us to form the fame conjectures of them. And as each ftar has, to all appearance, like our fun, its particular planets; and that these undoubtedly resemble ours, we in a manner, behold round us an innumerable multitude of worlds, each of which has its peculiar laws, arrangement, productions, and inhabitants. How numerous are the works of God! How glorious the starry sky! How great our Creator! Millions of worlds declare his glory, and the intelligent beings they contain, acknowledge and adore their Maker. How forcibly does this incline us to join with the heavenly choir, in finging his praife, that it may refound over all the universe! How happy the prospect that opens to us of that future state, wherein we shall be acquainted with these worlds, and able to comprehend the wonders of them! How great will be our aftonishment in discovering objects quite new to us, or at least very imperfectly known! In what splendor will the divine perfections appear, the power of which extends over a multitude of worlds, while fome falfely imagine it reaches only to the little globe we inhabit! What endless subjects for glorifying the Creator and Ruler of all these worlds!

JUNEL

DIFFERENCE BETWEEN THE WORKS OF NATURE AND THOSE OF ART.

WHEN we compare the works of nature with those of art, we find that the former has great superiority over the latter. The consideration alone, that the productions of art are only imitations of nature, is enough to prove this truth beyond a doubt. What artist is there that does not wish to come as near to nature as possible, and flatters himself he has succeeded, though in reality very far from it? He is not able to invent, and all he does must have been taught him by nature. How rich, and what variety there is in it! and, on the contrary how, how poor and dull is art! In the vast kingdom of nature we find an inexhaustible treasure; and any one of its parts a stone, a plant, an animal, affords us fo many objects worthy of admiration, that, in examining them with the utmost exactness, even to the smallest particle, we cannot discover the flightest imperfection in them. The works of art, on the contrary, are foon exhausted: if they are searched to the bottom, and strictly

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examined, we foon lofe the admiration they at first excited, and discover faults and imperfections not thought of before. What are the most perfect statues in comparison of a single animal, an infect or a worm? Nature is able, of herfelf, to produce the greatest master-pieces; whereas, art borrows from thence all that it has of the beautiful. It has nothing of its own; and nature has the first right over every thing. Let us add to this, how much less durable the works of art are than those of nature. When the former have been long destroyed, the others still subsist in all their primitive beauty. How fuperior the interior construction of the productions of nature to all the works of men! Compare, for example, the most ingenious machine to the mechanism of animals, and we shall be struck with admiration at the fight of the miracles of nature, whilst the master-piece of art will appear a mere bauble. Let us only confider ourselves with attention. The perfect and regular construction of our muscles and arteries; the wonderful circulation of the blood in our veins; the variety and number of movements in our lighbs; what proofs of the magnificence of God's works! and how poor and trifling, in comparison, are the productions of man! It would be easy to pursue these remarks, if what has been faid were not more than fufficient to teach us the just value of the works of nature. It is true that felf-love carries us fo far, that

we are but too apt to prefer our own works to all others; and our taste is so depraved, that we look on every thing with disdain and indifference, in which the industry of man has no share. Both these prove our ignorance and ingratitude. Can we be so unjust as to set less value on a watch, admirably finished by a great artist, than on a ball of snow, made up by a child? In thus robbing the ingenious workman of the honour due to him, should we not prove at the same time our own ignorance and folly? That is exactly our case, when we do not properly distinguish between the works of nature and of art. It is true that we ought not to despife the productions of art, for they also have their value; but, on the other hand, it would be abfurd to confider them as equal, and still more fo, to prefer them to the works of nature, which are infinitely fuperior. God made his works fo perfect, to the end that through them we might acknowledge his power, wifdom, and goodnefs. Let us faithfully fulfil this great duty, and never give up the contemplation of nature, nor forget the effect such researches ought to have upon us. Let the study of nature be our delight, because it will teach us more and more to know the Creator and Ruler of the world, and will continually excite in us a defire to arrive one day at a perfect knowledge of his works.

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JUNE II.

LEAVES OF TREES.

HE leaves of trees form one of the great beauties of nature. Our impatience to fee them bud in spring, and our joy when at last they appear, prove fufficiently that they are the ornament of our gardens, fields, and woods. How great the pleafure we enjoy in the hot fummer days, from the refreshing coolness of their delightful shade. Yet, after all, this is certainly the least of the advantages which accrue to us from the foliage of trees: we need only confider the wonderful construction of leaves, to be convinced that they were defigned for much more important purposes. Take the trouble to examine the first that falls in your way. Each leaf has certain veffels, which being preffed close at the end, or in the stalk, extend themselves like ribs within the leaf, and branch out in a thousand ways. There are no leaves without extreme fine vessels, and an astonishing number of pores. For example, it has been observed. that in a fort of box-tree, called Palma Cereris, there are above an hundred and feventy-two thoufand pores on one fingle fide of the leaf. In the open air, the leaves turn their upper fide towards the sky, and the under towards the earth, or towards the infide of the plant. To what purpose would this particular arrangement of the leaves

be, if they were of no other use but to adorn trees, and to procure us shade? Most certainly the Creator had fomething much more important in view. The nourishment of plants proceeds directly from the leaves: their pores serve to fuck in the moisture, or the juices of the atmosphere, and to communicate them afterwards to the whole plant. What wifdom there is in this organization! By these means the plants, in dry weather, run no risk of wanting nourishment; they receive abundance of refreshing dew, which falling from the upper leaves, waters those under them, and thus none of this nourishing juice is loft. And as plants perspire greatly, as many experiments flew us, the leaves appear to be the principal organ of this important perspiration. They ferve also to introduce into the plant the air it requires. They appear even to contribute to the preservation of the bud, which is to shoot the following year; for the eye of the bud is already under the leaf: undoubtedly it is guarded and preferved by them, at the same time that the quantity of juice where the leaf joins to the plant also serves to preserve it. This is the reason that many trees wither and die when their leaves are gathered. It is what fometimes happens to the mulberry tree, when it is ftripped without proper caution to feed filk-worms. This is also the reason that grapes do not ripen when the vine loses its leaves in fummer. Another remark may be made on this subject, which

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very much opens to us the manner of the plants growth: the under fide of the leaves always turned towards the ground, is generally of a paler and less bright colour; it is more rough and spungy than the upper side. Here again we discover the wifest purposes: the side of the leaf next the ground is rougher, and confequently more full of pores, in order to fuck in fo much the better what dew rifes from the earth, and to distribute it afterwards over the rest of the plant in more abundance. leaves then turn on the fide that can best receive the nutritive moisture; and this is the reason that the leaves of some plants incline very low down. If we observe trees growing on a steep hill, we shall see that their leaves do not take a horizontal direction, but evidently perpendicular; which proves that the leaves draw towards the fide where there is most moisture, and most of these juices so necessary to them. These reflections afford us new occasion to admire the wisdom of God. They may make us consider the leaves of the trees hereafter in a different light from what we have hitherto done. If we did not know the inimitable art of their construction, nor the important purpose of their existence, it would not be wonderful that we should see them with neglect and indifference. But when we know that each leaf is a mafterpiece of the divine power, and an organ of fruitfulness, it would be unpardonable to fee

them with inattention. They ought naturally to lead us to the following useful reflections: every thing, to the very least objects in nature, has been planned with wisdom by the Creator. There is not a single leaf that is a mere ornament. It contributes its share towards the fertility and support of the vegetable kingdom. If each leaf then is a master-piece of the divine wisdom, how wonderful must every single tree be to us? The faculties of our minds cannot reach the whole of the one only, and the smallest leaf might afford subject for reflection all our lives.

JUNE III.

THE REVIVING POWER OF THE SUN.

I Myself feel this beneficent power. As foon as the fun rifes over my head, it fills my foul with ferenity and joy. Its splendor and warmth inspire me with spirits and activity sufficient to sulfil the duties of life and to enjoy society. The involuntary indolence and lowness which made me inactive in winter, are by degrees vanished. I breathe more freely, and I employ myself with more pleasure. How can it be otherwise, when I am witness to the universal joy which the sun communicates to the world, and every where perceive its enlivening

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powers? It animates and revives all creatures with its benign influence. Millions of shining infects awaken, fport, and bask in its rays. The birds falute it with their melody. Every thing that breathes rejoices in it, and we every where trace its happy effects. It causes the sap to rife and circulate through trees, plants, and vegetables. It causes the leaves and blossoms to shoot. It sheds life and light throughout all nature. It is the fource of that warmth, without which every animal would languish and die. The effect of the fun is not only felt on the furface of our globe, but even in caves under ground, where it produces metals, and also animates living creatures. It penetrates even into the highest mountains, though they are composed of rocks and stone. It extends even to the bottom of the ocean, where it acts in feveral ways. When we reflect on these useful effects of the fun, it is natural to think of the miserable condition we should be in, if we were deprived of the light and heat of that celeftial body. Without it, what would our globe be but a lifeless mass, without order or beauty? The trees could not produce leaves, nor the plants flowers; the fields would be without verdure, and the country without harvest; all nature would have a gloomy, melancholy appearance.

The fun, with its reviving power, is the emblem of a truly charitable man. He also spreads joy and blessings around him. By him the oppressed heart is raised and strengthened, the afflicted are comforted, the ignorant are enlightened, and the poor relieved. Let us endeavour to resemble this beneficent and charitable man. Let us, according to our different stations, share with our fellow-creatures the goods which Providence has bestowed upon us. Let us instruct, comfort and relieve all we can. Thus shall we quit this world regretted and beloved, and thus shall our memories be blessed by our fellow-creatures.

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THE DESIRES OF THE SOUL ARE INFINITE.

LET us employ some moments in reflecting on ourselves. The soul has certainly the first claim to our attention. It touches us nearly, and ought to be dearer to us than all the pleasing objects which this season so particularly affords. Whatever satisfaction we find in contemplating the corporeal world, it cannot be compared to that which we experience in reflecting upon the nature and faculties of the soul. The observation of exterior objects, such as the traveller meets on the road, is certainly agreeable to him, because he requires to be amused and refreshed

through his pilgrimage; but that of spiritual objects leads directly to the bleffed immortality we may expect, as citizens of the world to come. Let us, therefore, sometimes reflect on the defires implanted in our fouls by the Creator. Experience proves, that our thirst of knowledge can never be fully gratified. We have no fooner made one discovery than we aim at another, Our defires are never fatisfied; and when we at last obtain what we had most ardently wished for, we begin again to form new defires: that of acquiring more and more bleffings accompanies us through life, and even in the moment of quitting the world. What conclusion can be drawn from this, but that as our defires continually extend beyond the prefent, without being ever fully gratified, there must be bleffings after death, beyond the limits of this life? We are not then designed for this transient life alone, but for an everlasting one. Was it probable, indeed, that man should be the only creature on earth endowed with faculties, without having, at the same time, the destiny for which those faculties were bestowed upon him? that man should have an instinct, without the means of fatisfying it, and be, in this respect, lower than brutes? When a heaft is hungry or dry, it finds means to supply its wants. We see the filkworm spin its bag, and shut itself up for its transformation. Would that happen if it was not defigned for another state, in which it was VOL. II.

to appear again under a new form? We see that birds lay eggs: would that be the case, if these eggs were not to serve for the preservation of their species, or that of other creatures? If our existence, then, was to be confined within the narrow limits of this life, why should we have received inclinations and desires which cannot be gratisted? Why those faculties which we could never make use of? No, certainly, our heavenly Father has not implanted endless desires in our souls to no purpose, much less to be a torment to us.

Being of beings! our fouls are capable of being filled with thy spirit; we are capable of being united to thee for ever; we may be raised above all earthly things, and foar even to thee. Is it then possible that fouls such as these should be annihilated? that we should have learned to know thee, to love thee, and to aspire to thee in vain? For we are far from it here: we know thee but in part; our love is yet faint and weak. It is impossible, that all our happiness can confift in this. Undoubtedly, whatever we poffess on earth are but pledges and forerunners of the infinite felicity which awaits us hereafter. This explains, this reconciles every thing; and we may clearly fee in this our future destiny. We fee that it is not in vain we wish continually to increase in wisdom and virtue, and to draw nearer unto God, the fource, the origin, and model of all perfection. We fee that the

happiness we cannot enjoy here, or at least but for a short time, we shall possess to all eternity in a future state. If we aim at perfection, we shall obtain it. No propensity, no defire, no faculty of the foul was given in vain. They will all be fully gratified and employed in a bleffed eternity.-Let us, therefore, rejoice in the immortality of our fouls. God himself has given us the sense of eternity. Let us not then dwell on visible, but on invisible things. In the midst of all the pleasures we here enjoy, of all our flattering hopes, let us aspire to those pleafures, those hopes, those unspeakable bleffings, which are referved for us in a better state. Let us employ the noble faculties of the foul in raifing us to heaven, for which purpose they were properly defigned. Let us preserve our fouls, which were created and redeemed for immortality, from the seduction of the senses, that they may not be absorbed in trifling pleasures unworthy of them.

JUNE V.

THE USE OF RIVERS.

WHEN we calculate the space which the rivers take up in our globe, we find they deprive us of great part of the continent. Some are discontent at this, and fancy it would be better to have had less of rivers, and more of

land. But if they would only confider, with wisdom, and in what due proportion the Creator has planned every thing upon our globe, they would conclude, that rivers have not been spread over the earth without good reason, and essential use to men and other creatures. It must be observed, in the first place, that the water of rivers affords a very wholesome drink to man. Spring or pump water, when it has been long and without motion under ground, loofens and infenfibly carries away with it fome particles which may be hurtful; but river water, which is continually evaporating, and always in motion, is purified from all dirt, and by that means becomes the most falubrious drink for men or beafts. However, the use of rivers extends still farther. Is it not to them we owe the neatness, the wholesomeness, and comfort of our houses, as well as the fertility of our fields? Our habitations are always unhealthy, when they are furrounded by stagnant water, and by marshes, or when the want of water occasions a drought. The smallest rivulet cools the air around it, and makes it extremely agreeable. It is the fame, in respect to the fertility of land; it is generally owing to the neighbourhood of rivers. aftonishing difference between a country well watered, and one to which nature has denied this affistance! One is a barren dry defart; the other, on the contrary, is in some fort a garden of delights, where woods and vallies, meadows

and fields, present a thousand beauties, and the most pleasing variety. A river winding through it, makes all the difference between the two countries: it every where conveys health, prosperity, and plenty. It not only waters the plants, but it also makes the earth fruitful, by its constant evaporations and inundations. Who can be fo inattentive or ungrateful as not to acknowledge how useful rivers are to whole countries, when we daily draw fuch numberless advantages from them? How could commerce be so conveniently carried on, if by means of rivers, we could not obtain from the most diflant nations the merchandise and goods we require? How many machines and mills we should be deprived of, if they were not put in motion by rivers! How many kinds of delicate fish we should want, if they did not furnish us with abundance of them! Certainly, if there were no rivers, we should escape those inundations which do fo much mischief. When they overflow their banks, they make havock and devastation in flat countries. But is this inconvenience fufficient to prevent rivers from being a bleffing of Providence? Do not the numberless advantages which accrue from them much exceed the mischief they do? Inundations seldom happen, and they extend over very little country. Befides, whatever destruction they occasion, by overflowing lands, there still refults much good; for the very inundations manure and enrich the

ground; and, to an attentive observer, they prove that God bleffes with one hand, whilft he appears to chaften with the other. Thus, then, the rivers ought to convince us of that divine goodness which is over all the earth. We see that all parts of nature, and all the elements, combine to make us happy, and to procure us a thousand conveniencies. If one only of the bleffings of God failed us, their privation would destroy much of our happiness. If there were no rivers there would be no fertility, and the earth would be but a barren heap of fand. What shoals, what innumerable multitudes of creatures, who can neither live in the air nor on land, would fuddenly perish, if the almighty hand, which created rivers, were to dry them up!

TUNE VI.

THE VARIETY OF FLOWERS.

W Ecannot but be struck with assonishment, when we consider the prodigious number of slowers which are produced in spring, summer, and autumn. But the variety amongst this numerous tribe is perhaps still more surprising. Certainly, nothing but a divine power could cause such numbers to grow; while this power must have been united with wisdom equally great,

to produce fuch infinite variety. If they had all been perfectly alike, the fameness would have fatigued the fenses; and if summer produced no fruit or flowers, but fuch as spring affords, they would give us no pleasure, and we should foon tire of the cultivation they require. It is confequently an effect of divine goodness, to have varied the vegetable productions fo agreeably; and to have added that-charm to their other perfections. This variety does not only extend to the whole tribes of plants, but to the individuals also: the carnation differs from the rose. the rose from the tulip, the tulip from the auricula, and the auricula from the lily; but each carnation, rose, &c. has also its own particular beauty and character. Each has something peculiar to itself. There are not two flowers, of the fame species, perfectly alike in form and shades. Take a view of a bed of flowers in a parterre: there you may behold some a great height, that feem to foar above the rest; some of a middling rank; fome that bear their stately heads above the height of man; others that creep upon the ground; some that dazzle with their rich colours, others that are simple and make no show; some perfume the air with exquisite odours, whilst others only please the fight with their beautiful colours. The flowers no less vary with respect to the seasons: in spring, when men leave the cities, in order to go and view the productions which a bountiful Creator

grants for their fublishence, they then fee the bloffoms in full bloom and beauty. Towards fummer, when the attention is particularly led to fowing feeds, a thousand, and a thousand flowers present themselves to the fight, and form a beautiful scene. They succeed one another regularly, and in the order defigned. When winter at last arrives, it brings other plants with it; which, though they may not please the eye, have their uses. If we observe the race of vegetables, we shall still find more and more varieties of them. What a difference! how many degrees between the grafs, which grows amongst the stones, and that useful plant, to which we are indebted for the most wholesome food, and that which we can the least dispense with !-Amongst the creeping winding plants, what difference between the weak ivy and the vine, whose grapes afford us fuch delicious drink! Amongst the trees, what a difference between the wild plum-tree and the oak!

With what wisdom God has planned all his works! This is the natural conclusion to be drawn from these reslections. With what wisdom the whole plan of the vegetable kingdom is formed, and how perfectly executed! In all his works, the useful and the agreeable are united.

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JUNE VII.

THE USE OF VENOMOUS PLANTS AND ANIMALS.

EVERY thing on earth, confidered feparately, is good and wholesome; and if any thing becomes hurtful, it is because we make a bad use of it, instead of that for which it was designed. From thence it is, that a fort of food which preserves the life of one animal, destroys another; and that a plant which, in some cases, is confidered as poifonous, is on other occasions. very useful and falutary. Thus, for example, hemlock was formerly supposed deadly poison, and now a number of experiments affure us, it makes admirable cures. The multitude and vaniety of vegetables which grow upon the earth is prodigious: but we must not imagine they were all created for the use of man. Some plants are defigned for beafts, others furnish us with dress and ornaments; some please our taste and finell, and a great number of them are medicinal, and would be of great use in many maladies which men and animals are subject to, if they did not mix bad ingredients with them-The fame thing may be faid of many live creatures, which, though very dangerous to us, are very useful to other animals, either as food or medicine. Most birds make their chief food of

infects commonly thought hurtful. Domestic birds eagerly swallow spiders. Peacocks and swans delight in all-sort of snakes. If we also confider how many excellent medicines are composed of the most poisonous herbs, nothing can be more easy than to justify the wisdom and goodness of God in forming creatures useful to us in fo many ways. The following reflections will more and more convince us of it:-The number of noxious plants and animals is nothing in comparison of the multitude of those that are of the greatest use to us. The Creator has also implanted a natural instinct in men and animals, which gives them an aversion to whatever is prejudicial to them. The mischievous beafts have a certain fear of man, and scarce ever make use of their offensive arms, unless they are attacked or provoked. Befides, the most noxious animals have evident marks and characters by which their dangerous properties are eafily known; that, by being warned, we may avoid, or prevent the danger. The rattle-fnake, which is the most venomous of all fnakes, gives warning of its approach by the clattering of the rings in its tail. The crocodile is fo heavy in its motions, and turns with fuch difficulty, that it is very easy to escape from it. Divine goodness has even fo wifely disposed things, that the most dangerous and venomous animals furnish the remedy with the poison. Thus the scorpion oil is an infallible remedy for its fling. A bee bruifed,

rubbed, and put on the wound, cures it. fat of vipers is also an excellent remedy against their bite. It may be faid, perhaps, that it would be better, if there was no plant or animal that could hurt other creatures. But it would only prove our ignorance and felf-love. If God ordained, that one creature should hurt another, it was for very wife purpofes; and from this plan there accrues to us many very great advantages. Several creatures which appear hurtful, are not really so, at least in certain respects. Their poison, and even the organs they make use of to wound others, are absolutely necessary to them. One example may serve for all the rest: the bee often gives pain with its sting, but if it is taken from it, the bee can never be of any use afterwards. It is the fame throughout all nature. Every thing that appears hurtful, is in reality, indispensably necessary. Wherefore, then, has man the prefumption to decide what is hurtful or useful in nature? Who can fay it is contrary to the wifdom of God that we should sometimes feel pain? Do not the most disagreeable things often procure us the greatest advantages? In general, it is certain, that natural things are only hurtful by accident; and if we receive harm from them, we may always blame our own impru-

the tend of account answers that the

JUNE VIII.

THE PERFUME OF FLOWERS.

THOUSAND pleasing cheerful objects furround me on all fides. Every thing I fee, every thing I hear, all the fensations which smell or tafte can give, they all contibute to my enjoyment or happiness. Every thing in nature, at this beautiful feafon, feems combined to fill my mind with the fweetest and purest delight, and to lead my heart towards God. Every object that excites my admiration, inclines me to look up to him as the Source and Giver of all that we enjoy. Each flower is a proof of his power and a mark of his existence. I will, at prefent, confine myfelf to the pleasure I receive from the variety of fweet perfumes which the flowers afford. It would have been a great instance of God's goodness, to have pleased the eye alone with the wonderful variety in the vegetable kingdom, but he has graciously added, to the other charms of flowers, that of fweet perfumes; and there is as much variety in their fmell as in the flowers themselves. Though we cannot exactly determine in what the difference confifts, we perceive it fenfibly in going from one flower to another. It is also remarkable. that the fmell is neither strong enough to hurt the head, nor weak enough to lose its pleasing effect. The particles which the flowers exhale are so light and fine that they disperse to a distance, and thus are not troublesome. A grain of amber can fill a whole room twenty seet square and fifteen high with its persume. The smell of the rosemary that grows in Provence reaches twenty miles beyond sea.

But how is it that the vapours which exhale from plants, fo easily reach the organs of smell? It must be attributed to the construction of the nose. It is composed of two cavities separated by a partition. They unite by degrees, and end in one only, which reaches to the bottom of the throat, where there is a communication with the mouth. All this cavity is lined with a membrane, which is one continued feries of nerves. These come from the brain through a bone pierced full of holes, which, on that account, is called the fieve-like bone. The fmellingchannel being wide at bottom, and growing gramually more narrow towards the top, occasions the fmelling corpufcles to accumulate in the upper part, when we breathe the air through the nose; and, of course, must affect those nerves the more. By this means, we receive the impression of even the least smell. Let us also observe, that divine wisdom has formed bony plates, which stop the upper part of the nose, and which have a twofold use. They prevent any thing hurtful from entering into the breathing passage during sleep, or when we are unable to guard it otherwise. They receive and

fupport the branchings of the olfactory nerves, a great number of whose little branches and threads, are dispersed in these bones; and, by that means, these nerves meet every where the odoriferous corpuscles, which strike them when they enter the nose with the air.

JUNE IX.

THE MULTITUDE OF ANIMALS.

I HE naturalists, who have taken the trouble to calculate in gross the number of living animals on our globe, have discovered about 400,000 species of them. However prodigious this number may appear, it is by no means exaggerated. There is reason to suppose, that, in the known parts of the earth, there are more than 450 kinds of land animals, 600 of birds; more than 2000 of finy fish; more than 3000 of shellfish; more than 20,000 different forts of infects, visible to the naked eye. In this number the infects which belong to different forts of animals are not comprised, and which at least amount to 100,000 species. There are also an infinity of insects still unknown to us, we may presume above 200,000 forts. And what shall we fay to the innumerable multitude of infects, which feed on plants only! 18,000 species of plants have been reckoned. In giving, then, but four species of insects to each, we find

that this amounts to 72,000. Such a number of animals living on our globe certainly appears prodigious; but it will not be found too much, if we believe with some naturalists, that every part of the immense kingdom of nature is animated, and filled with live creatures. Very skilful physicians maintain, that the disorders, which are attended with blotches and pimples, and even certain fevers are occasioned by worms. It is also very probable, that the atmosphere is fometimes peopled with animals, although their extreme minuteness prevents them from being visible. Who knows whether that fort of trembling motion feen in the air during fummer may not be produced by millions of infects fwarming in the atmosphere? Let us take the first flower' that falls in our way, for example, a daify or a rose, and we shall find a whole multitude of infects, whose figure and variety of motion will amuse us. Is there the smallest spot in nature where living animals may not be found? Nature has even produced animals in other animals, and made one animal to be as a world for other creatures to fubfift in. The air, the juices of animals and plants, corrupted matter, excrements, fmoak, dry wood, and even the hardest stones, in some measure, feed and serve to lodge living creatures. The fea feems an element made up of animals. That light observed upon it in fummer nights, is owing to innumerable little shining worms, whose parts, when divided from

the body and corrupted, still shine, as the worm itself did when alive. Whole swarms of animalcula, which the eye cannot reckon, flutter and sport in the rays of the fun. All these innumerable animals of our little globe are infinitely divertified in their form, their organs, and their limbs, their faculties, and motions. Undertake, O man! to name all these animals. Undertake to express by numbers the individuals of one fingle species. Undertake to calculate how many herrings, flies, worms, birds, &c. there are. How could you do it? Their number is unknown, and, if it were not fo, it would be impossible to express it by cyphers. Here we have a fine subject of admiration, in reflecting on the infinite power of our Creator. He alone produced, he alone preferves and supports this immense multitude of creatures. Confider how much food fuch a number of animals require. If they only lived at each other's expence, if they destroyed one another, nature would prefent us nothing but a frightful feene of murder and flaughter. But happily there are not many carnivorous animals; and thefe are very useful in devouring carcafes, and, by that means, guarding us from infection, as well as preferving a certain balance, by preventing any fpecies multiplying too fast. Besides this, the Creator has properly defigned the vegetable kingdom for the food of animals; and he has affigned to almost each species of beasts, a partieular kind of plant. In order that all forts of animals should have food in proportion to their number, he has ordained that they should live in the different countries of the earth. How exactly has he even measured the ground! One fingle tree, is larger than thousands of plants; vet, it fills up no more space on the surface of the earth than a few feet square, and a multitude of quadrupeds, birds, and infects, find their food there, and lodge in it. What care also has the Creator shewn, in surrounding all animals with a fluid matter adapted to their different natures. Two forts of feas are destined for them; one of water, and one of air. All living creatures are in one of the other of thefe two elements, except the fmall number which can live in either. The bottom of thefe two feas is the habitation of a part of those animals; fuch as are in the upper fea, the reptiles and most of the quadrupeds; and, in the lower sea, the zoophites, the shell-fish, corals, ovsters, &c. Others have the power of rifing and descending as they please in their element, as the birds and infects do in the air, and as the whales and most other fish do in the water.

And the Atheist dares to say in his heart, that there is no God! Senseless man, "Go and ask "the beasts, and they shall teach thee; and the "fowls of the air, and they shall tell thee; or "speak to the earth, and it shall teach thee, "and the sishes of the sea shall declare unto "thee. Who knoweth not in all these, that the hand of the Lord hath wrought this?"

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JUNE X.

IMMENSITY OF THE FIRMAMENT.

their food by well and to the de COME, O man! and contemplate the firmament, behold that multitude of lights which thine and illumine your nights. Try to count them; but thy weak fight is unable to do it; and thy eyes are lost in the numberless stars. Well, then, take thy telescope, and double thy fight: what dost thou now fee! To the first millions, new millions of worlds are added. Continue these observations, and undertake to count the stars thou hast discovered. Thy ideas are confounded. Thou feeft that it is beyond the power of numbers to express such immense multitudes. It is true that for many ages past mankind have tried to find out the number of the stars, but the discoveries made in the heavens, fince the invention of telescopes, plainly prove, that no man can afcertain the number of them. To count the stars would be as imposfible as to reckon the grains of fand on the feashore. However, before telescopes were made, we could not discover so many as are now visi-

ble to us. One of the most ancient astronomers reckoned but one thousand and twenty-fix; the catalogue was afterwards encreafed to one thoufand and eighty-eight stars. But the observations made fince by the affishance of telescopes, have convinced mankind, that the human fight cannot discover all the celestial bodies. Our instruments have informed us, that the long white and luminous tract, which fills a large part of the sky, called the Milky Way, is composed of a multitude of stars. We know even that in places where we faw, with a naked eye, but one fingle flar, the telescopes have fince discovered many more to us. By their means, we distinguish in two constellations alone, twice as many flars as we reckoned in the whole fky. How much has this of course enlarged our ideas, in respect to the greatness of the universe? But if the discoveries already made, have so increased our admiration of the immenfity of the divine power, it will rise still higher, when we restect how vast these bodies must be, which, notwithstanding their prodigious distance from us, are many of them visible to the naked fight. Exact calculations which may be depended on, inform. us, that a canon ball would take more than feven hundred thousand years to reach from hence to the nearest of the fixed stars. And yet the greatest astronomers agree, that these numbers are not fufficient, to express even the apparent distance of a fixed star. Some of these globes

appear to us to be the largest, because they are the nearest to us: they are, on that account, called stars of the first magnitude. Those nearest to them are called stars of the second magnitude, because being much farther from us, they appear smaller. They must be at as great a distance from the former, as the latter are from us. Those of the third magnitude, must be three, those of the fourth, four times farther from us than the first, &c. Supposing there were but twenty of these, it would follow, that the diameter of the whole universe, if there were only twenty classes of stars, would be so great, that a cannon ball could not go through it in twenty-four millions of years.

Sovereign Ruler of the universe! Father of spirits and of men! Oh that my ideas were vast and fublime as the expanse of the heavens, that I might worthily meditate upon thy greatness! that I might raife them even to these innumerable worlds, where thou displayest thy magnificence still more than on this earthly globe! that as I now pass from flower to flower, I might there go from star to star, till I arrived at the august sanctuary where thou sittest on the throne of thy glory! But my defires are vain, as long as I am a sojourner upon earth. I shall not know the wonders of the heavens, till my foul is delivered from the incumbrance of this gross body. In the mean time, as long as I live in this world, I will fing thy praise. assembly are to be principle.

JUNE XI.

SINGULARITIES IN THE VEGETABLE KINGDOM.

HE variety of animals is fo great, that it appears at first difficult to find connection between them and plants. Some beafts live only in water, others only on land, or in the air: fome which can live in either or both equally. But it may be faid literally, that it is the fame in respect to vegetables. There are plants which only live in the ground; others that only grow in water; others that can bear no moissure: others, still, which live equally in land or water: there are even some that live in the air. There is, in the island of Japan, a tree which, contrary to the nature of all other plants which require moisture, cannot bear it. As foon as it is wet, it withers, and the only way to fave it from dying, is to cut it down to the root, to dry it in the fun, and afterwards plant it in a dry and fandy foil. It is known that a fort of mushroom. of moss, and other little plants, swim in the air: but, a more extraordinary thing is, that a sprig of rosemary, which was put into the hand of a dead person, (according to the custom of some countries), too root so well to the right and to the left, that, at the end of some years, when the grave was opened, it had covered all

the face of the corps with its leaves. The vegetation of the truffle is still more fingular. This extraordinary tubercle has neither roots nor stalk, nor leaf, nor blossom, nor even any visible seed: It draws its sustenance through the pores of its bark. But how it is produced, or why, in general, there should be no other herb where these fort of mushrooms grow, and the earth be light and porous, has not yet been accounted for. There is no plant which can better be compared to the land and water animals than that fort of membranous moss, callen nostoch. It is an irregular body, a little transparent, and of a pale green colour: it trembles when touched, and is eafily broken. It can only be feen after it has rained; it is then found in feveral places, but chiefly in uncultivated ground, and along the fides of fandy roads. It is formed almost in a moment; for, when in fummer, walking in a garden, not the least trace of it is feen, on a sudden a storm of rain falls. and in an hour after, in the same spot, the whole walk will appear covered with a great quantity of it. For a long time it was supposed that the nostoch fell from the sky; but it is now known to be nothing but a leaf which draws the water greatly, and fucks it in. This leaf, to which no root has been discovered, is in its natural state when it is well impregnated with water; but heat, or a high wind, makes the water evaporate in a few hours, and then the leaf con-

tracts, shrinks, and loses its transparency and colour. From this circumstance, it appears to grow fo fuddenly, and to be created in a wonderful manner with the rain; as a fresh shower falling on it, when it is withered and invisible, revives and makes it again appear. The lift of plants which have fome relation with animals might be confiderably increased. But there are still more fingularities worth observation amongst the vegetables. The whole atmosphere is filled with millions of invisible plants and seeds. Even feeds of a larger fort are scattered by the wind all over the earth; and, as foon as the air has carried them to the places where they can thrive, they become plants; and it requires so little for that purpose, that it is difficult to conceive whence they can draw what is necessary for their growth. There are considerable plants, and even trees, that take root and grow in crevices of rocks, without the least earth. Vegetation is fometimes formed inconceivably quick. For example, mushrooms and water-cresses, if the feed of them is put into wet linen, it becomes a fallad in 24 hours. There are plants which appear to have scarce any life, and yet they continue to exist. We often see willows, not only hollow and decayed within, but the outer bark fo hurt, that there scarce remains an eighth part of it. These trunks, however, poor as they are, break out again every fpring, and shoot into numberless branches and leaves. How wonderful it is, that the nutritive juice of plants is not only supplied by means of the root, but by the leaves also, which draw it from the air, and, in some degree pump it in; and that there should be plants, the branches of which become roots, and the roots branches, according as they are turned in planting them! The great age also to which trees arrive, how surprising it is! There are apple trees, which must be above a thousand years old; and, if we calculate in the gross, the fruit which such a tree produces every year, we cannot but admire the fertility of a pippin, which might singly supply all Europe with trees and fruit of that fort.

But we should never have done, if we were to purfue these reflections as far as they might lead. Every thing is full of wonders: every thing marks to us a Being of perfection, whose power, wisdom, and unbounded goodness all join in heaping upon us continual bleffings and enjoy-Ungrateful as we are, shall we not youchfafe to reflect on the many wonders that continually furround us? In reflecting on them shall we not look up to the source, from the creature to the Creator, from the plant to him who made it. On whatever fide we turn, new wonders appear. The country, the vales, and the mountains, the rivers, and the fea, all, from the lowest atom to the highest sphere, is full of the goodness of God!

JUNE XII.

Means of Happiness which we find in Nature.

I O be convinced that, throughout all nature every thing tends to the benefit of mankind, we need only confider, in the first place, the close connection and relation between all natural things and us. It is true that there are feveral bodies, the use of which we do not see relatively to man; but we must not conclude from thence. that we draw no advantage from them. Many things which appeared useless to our ancestors. do not now appear fo; and it is to be prefumed. that our descendants will, in their turn, discover what we are at present ignorant of. Let us acknowledge the divine wisdom in this. The real use of many creatures is concealed from us, in order to humble our pride, by making us feel how limited our understandings are, and to exercise our minds, and lead us more and more to the contemplation of God's works. Many things in nature are only indirectly useful to us: feveral animals force as food for mankind, and confequently all that ferves as fuftenance for them, is beneficial to us. We see a multitude of creatures which feed on others: the small fish are the food of the larger; many birds feed on worms and infects; and there are feveral Vol. II.

fpecies which live entirely on prey. The divine wildom manifelts itself again in this circumflance; for if the fields and productions of the earth were to feed all the animals, there would not be enough left for the use of man : and what would then be the fruit of his labour? I allow that there are feveral animals which might be faid to be created only to hurt mankind; for example, venomous creatures. Poifon is fo hurtful to the human body, that it generally causes a painful death; and its effects are sometimes fo quick, that there is fcarce time to have recourse to antidotes. It is true that, in this refpect, many animals appear in a bad light; but if we consider them on another side, we shall discover traces of God's goodness, and have reafon to admire his wisdom. Physicians make use of poifon in many excellent medicines. Would mankind have been happier, if there had been no venomous creature in the world? The poison they have in them, had made before a part of those had vapours, which mankind would have breathed, and which would have been prejudicial. In a word, it may be faid with certainty, that there is nothing on earth really hurtful to man, unless he makes an improper use of it. But if, in creating our globe, God proposed to himself our happiness, should we not be inexcusable to interrupt his falutary defigns, by obftructing our own happiness, instead of labouring for it with all our might? God's views are

all merciful towards us, but we often render them useless by a conduct which must necessarily make us unhappy. Let us be wifer and make a better use of the many means of happiness with which God so abundantly furnishes us. And if it is not possible to satisfy all our wishes in this world, let us have recourse to religion, which will amply compensate for any defects in nature, and will explain to us many things which appear obscure.

JUNE XIII.

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THE LOADSTONE,

THE loadstone is the most singular of all minerals in its properties. It is a ferruginous stone of a dark grey colour, and has the virtue of attracting iron. This virtue is not equal throughout the whole stone, but resides chiefly into two of its points, called the poles of the loadstone. When this stone is suspended by a string, and unconfined, it constantly points one of its poles to the north and the other to the south, if first put in motion, and then left to itself. This regular direction, which only varies a little in some particular parts of the earth, has given the name of northern pole to that which points to the

north, and fouthern to that which points to the fouth. The two properties of attracting iron, and pointing towards the north, is communicated to iron by rubbing it against the loadstone. This discovery introduced the magnetic needle, fo indispensably necessary to navigators in long voyages; which proves, that things may become very useful to the world, though at first fight they appear of little importance; and that, in general, the knowledge and study of the magnificent works of the creation is of infinite advantage to the human mind. These virtues in the loadstone prompted the naturalists to examine farther into it, with the hope, not only of finding out the cause of such surprising effects, but of discovering new properties in the stone. They were more fortunate in the latter than in the former. It was observed that the loadstone does not at all times, and in all places, point to the north; but that it fometimes inclines a little to the east, sometimes to the west, sometimes more and fometimes lefs. It was observed, that its attractive powers were equally strong, though bodies were placed between the iron and the stone which might be supposed to prevent the effect. Glass, fire, water, men, and animals, with every metal, except iron, give free passage to the loadstone, which is not prevented by their interpolition, from acting fenfibly upon iron. It was discovered that, in two loadstones, the two poles of the fame name, the two northern and

two southern poles, repulsed each other, and seemed to fly one from the other. It was therefore concluded, that the power of attraction might be in the iron as well as in the loadstone, as they seemed to attract each other equally. In order to be convinced of this, one need only hang a loadstone on one end of the beam of a balance, and put an equal weight at the other end, and when the loadstone is balanced, and not in motion, to place a bit of iron under it: the loadstone will be immediately drawn down by the iron, and the other weight will fly up. If their situation is reversed, the loadstone will attract the iron in the same manner.

However fingular these things are in the loadstone, there is another circumstance no less worthy of observation; which is, that all the endeavours and all the fagacity of philosophers, who have taken such pains to discover the cause of these wonderful effects, have been hitherto fruitless. The loadstone is still a mystery to the human understanding. Ought we then to be furprised that, in religion, which is infinitely raised above all that can affect the senses, we should find mysteries we cannot penetrate, and the perfect knowledge of which is referved for the future state? Is it surprising, that some things in religion should be incomprehensible to us, when in natural things, which we fee with our eyes and feel with our hands, there are fo many objects which oblige the most distinguished

men of learning to acknowledge their ignorance. and the weakness of their understanding. There are, however, mad people, rash enough to doubt, and even to deny, whatever they cannot comprehend in religion. If this confequence was right, we might with much more reason say, that the loadstone does not attract iron, or point to the north, and that all is false that is said of it, because we can neither explain nor comprehend it. When natural things are in question, one may fay to fuch sceptics, Come and see. But the mysteries of religion are not seen with the eyes of the body. The mind alone perceives them, and will understand them perfectly when admitted into the kingdom of light. Let us wait for this happy period; and, if we find any thing obscure and inexplicable in religion and in nature, let us remember, that the imperfect state of our fouls and bodies prevent us from fearching to the bottom of them. Let us remember, that a confiderable part of the happiness of the world to come, will confist in having a greater and more perfect knowledge of all that can contribute to complete our felicity, and to prove the glorious attributes of the Being of beings.

JUNE XIV.

CHERRIES.

Lang ad block 12 Wolley CHERRIES are a fruit which, from their fweetness mixed with a pleasing acidity, quench the thirst, allay the fever of the blood in the heat of fummer, and prevent the bad humours to which we are but too liable at this feafon. In the first place, they quench the thirst by their sharpness, which contracts the glands, cools the parched tongue, and moistens the dry palate. This method of appealing the thirst in hot weather is much to be preferred to all those drinks with which we fill ourfelves, and only the more increase our heat and perspiration. But, besides. the cherties quenching our thirst in the most pleasing way, they have a cooling quality which tempers the heat of the blood, calms the animal spirits, of which the too great impetuosity and agitation affect and weaken the nerves. Thus the wholesome juice of the cherries, their acidity, and their aftringent virtue, cool us delightfully in the great heats, prevent the blood from being too thin, thicken the fluids, and keep them from corrupting.

With what goodness the Creator has provided fruit adapted to every season! In these hot months we require cooling acid fruit, and he surnishes us with abundance of it. He gives us fruit equally wholesome and pleasant. He gives it

even in such quantities, that the poor may enjoy it as well as the rich. Let us make this comfortable reflection whenever we fee a cherry-tree loaded with fruit:-How fad would be the fate of the labourer, who is obliged to earn his bread with the sweat of his brow, if, to refresh himfelf, he must have recourse to those delicious drinks referved for the great and rich, and could provide himself with no other? Merciful Father! thou forgettest not the poor; thou suppliest their wants: thou vouchsafest to refresh them with fruits within their reach; and the cherries are as wholesome for them as lemonade and wine are for the rich. What wonderful plenty there is of acid cooling fruits at this feafon! Our gooseberries, cucumbers, stone-fruit, and falads, are so many pleasing preservatives of health.

Let us, therefore, never see or enjoy the fruits that our Creator grants us, without acknowledging and bleffing his goodness, or without making these reslections which so naturally present themselves: the heavens, the earth, the elements, and every creature combine to make us happy. Wherever we turn our eyes, we are surrounded with bleffings. The animals, the corn, the vegetables, and the fruit, in the vale, on the mountain, in the forest, and the sea, all serve for our sustenance and enjoyment. The beneficent hand of God is ever open to us. How

many occasions have we daily to look up to him with grateful hearts, and to bless him evermore.

JUNE XV.

THE WISDOM OBSERVABLE IN THE CON-STRUCTION OF THE BODIES OF ANIMALS.

I HE formation of the animal body affords the most striking proof of divine wisdom. For, as fome animals were to refide chiefly in the air, others on the earth, and others in the water, it was necessary that their construction should be conformable and adapted to their fituation and different kinds of life. The wisdom with which God has done this cannot be too much admired. Every thing is so exactly disposed as each animal requires it, that if their construction had been like any other but their own, they would have fuffered by it confiderably, and could not have fulfilled their destination. The birds of prey are provided with nails, strong claws, sharp and hooked bills, that they may, with the more fecurity and ease, catch their prey.-Those who are to feek their food in marshy places require a long small bill and long legs; as it was necessary that those which live in water should have the

lower part of the body very large, a long neck, membranes or fort of oars to the feet, with an oilinefs in the feathers, to make them glide smoothly. The infects that live on prey have mouths shaped like nippers; and those that suck their food are provided with a fling or trunk. Why have the hares or rabbets full fet eyes, but in order to fee fo much the better to avoid the fnares and dangers to which they are exposed? Why are the eyes of the mole fo funk and fmall, but that living under ground it does not require much fight, and because that full eyes would incommode and hinder their burrowing under ground? Why is the crystalline of the fishes eye so round, but to compensate for the refraction of the rays of light; whereas animals that live in the air have lenticular crystalline, or in the form of a flat sphere? Why have animals, (whose eyes move,) but two, whilst those that cannot move theirs have several? Why have the animals who feek their prey in the dark, larger pupils and more brilliant eyes? Why does the eye of the hen answer the double purpose of telescope and microscope, but that she may seek the very smallest feeds in the earth or gravel, and discover at a distance the birds of prey that might feize upon her chickens! With what amazement we must be struck in considering the apparatus for the organs of animals. in respect to their several motions! What a multitude of limbs! what suppleness! what slexibi-

lity! How many muscles, nerves, bones, and griftles, these varied motions require? Some animals move flow, others quick; fome with two feet, others with more; some with both wings and feet, others without either. The flowness or swiftness of motion is always regulated according to the different wants of each animal. Those that are well arined, and have courage, skill, and strength enough to defend themselves against their enemies, move more flowly than those that are defenceless. Who gave to ferpents and other reptiles the power to contract and firetch out their bodies, to roll. themselves up, and to dart out afterwards from one place to another to feize their prey? Who formed the fish in such a manner, that, by means of their bladder, they can rife and fall in the water at will! Who taught the final to contract its body, and bring water into its little house, when it wishes to fall on the ground! What art appears in the formation of birds, inevery part of their bodies, and particularly intheir wings! How well their body is formed for Right! Small and sharp before, and increasing gradually till it is of a proper bulk. This adapts: it for cutting the air, and making itself a palfage through that element. The feathers are all arranged with much ars, and laid one over another in a regular order, to facilitate the motion of the body, and, at the same time, to ferve as a covering to defend it from the leverity

of the cold and bad weather. Though firm and close together, they can spread, rise up, swell, and take up more space, just as the bird requires it. The wings, which are the chief instruments of flight, are put in the properest end most convenient place to balance the body exactly in the midst of so thin a sluid as the air. What admirable work is there not in every feather! The quill is stiff and hollow towards the bottom, which makes it both light and ftrong; the beard of the feathers is ranged regularly, broad on one fide, narrow on the other; which is of wonderful use in the progressive motion of birds, as well as in the close and strong texture of the What proportion we fee in the manner of placing the feathers! They are always fo placed as to agree exactly with the length and strength of each feather, and the large serve to fupport the smaller. In the bony part of the wings what a multitude of joints, which open, thut, or move, according as it is necessary either to extend the wings or draw them close to the body! What extraordinary firength in the breaft bones and muscles, that the bird may cut the air with more rapidity! What incomparable art in the formation of the tail, to make it in some measure serve as a rudder to direct the flight, and help the bird to afcend and descend in the air, and prevent the unsteadiness of the body and wings! How much the disposition of the body and wings is adapted to the feveral movements! In some birds the claws are large, and furnished with membranes that extend and contract for the purpose of swimming; in others they are sharp, and bent down at the point, that they may walk the sirmer, perch, seize, and hold their prey. In some the legs are long, that they may walk into, and rake their food out of the water and marshes: in others they are shorter; and in all are adapted to their way

of living, and whatever they require.

Who is here that will not in this acknowledge the furreme intelligence of the Creator and Benefactor? Is it possible, that things so wonderful, fo regular, fo admirably proportioned, should be the work of a blind chance? Could any one be perfuaded, that fuch a multitude of veins, muscles, joints, &c. should be put in motion in each animal without defign? and that all the parts, even the smallest, should be connected with each other, and perform their different offices with fuch perfect harmony and regularity? Ought it not rather to lead us to think of the Creator of all things, whose wisdom and goodness have placed so many creatures exactly in the circumftances most fuitable to them: and endeavour to be more and more acquainted with this great Being, who has fo gloriously shewn himself in all his works.

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JUNE XVI.

THE DEW.

was specially after allates many month by HE wife ruler of the world, who watches continually over his children, and provides for all their wants, makes use of more than one means to render the earth fruitful. Sometimes. it is by inundations: it is true, that when these lay countries waste, the farmer who only thinks. of the present, gives way to ungrateful murmurs; but, in the end, if their happy confequences for the general good is properly confidered, it must be allowed, they are very beneficial. Sometimes it is by a river, which like the Egyptian Nile, has the fingular property of overflowing its banks at certain marked periods, to water a country where it never rains. Sometimes it is by rains, which fall more or less frequently, in order to cool the air and water the parched ground. But these methods of watering are not regular, nor always sufficient. The most common means, the furest and most universal, but that which men the least attend to. and are least sensible of its value, is the dew .-This inestimable gift of Heaven (which even in years of the greatest drought, supports and preferves the plants from perishing,) comes in those fparkling drops feen in fuch profusion morning and evening on the leaves of trees and plants.

The dew does not fall from above, as was formerly imagined: it does not defcend from the highest parts of our atmosphere, and still less is it the fweat of the stars, as superstition had supposed. This pretended celettial origin has probably given rife to the folly of some alchymifts, who hoped to convert dew into gold. It is now generally allowed, that the dew is nothing but the sweat of the plants, and the moifture they draw from the earth. In order to be convinced of this, one need only cover a plant with a glass bell, and it will appear that the leaves collect in the night a greater quantity of dew drops, than the leaves of the other plants which are exposed to the air. This certainly would not be the case, if the dew fell from above, and if it did not rife from the ground. Nothing is more easy either, than to comprehend how it is formed: for nobody is ignorant, that the rays of the fun, and the heat which is cast on the earth, continually loofens a multitude of thin particles from off every thing, fome of which rise into the atmosphere and the rest collects in the form of drops of water. This account of the dew explains to us, how it happens that it is fometimes hurtful, and fometimes not fo. Its nature evidently depends on the quality of the vapours of which it is composed. The wind carries away the light exhalations as foon as they are formed, and prevents them from falling in drops. This is the reason that there

is most dew when the air is very calm. By this wise plan of the Creator, the plants can vegetate and grow in countries even where there is no rain; for the soil of those parts being sandy, porous, and very moist underneath, the heat draws out a great quantity of dew, which surrounds the plants and supplies the place of rain.

Those different methods which Providence makes use of to moisten and fertilize the earth, ought to remind us of those he employs to improve the barren heart of man, and to make it fertile in good works. Chastisement, more or less fevere, bleffings of every kind, exhortations, warnings given us from the example of others, and a thousand such means, are made use of by our gracious God, to lead us to himself. Sometimes in the natural world there comes a storm of rain from the clouds, which deluges the country, drags every thing along with it, and makes the rivers overflow their banks. At other times, God calls the foft dew from the earth, and thus, in a manner fecretly grants the wishes of the farmer for rain. It is thus in grace he also makes use of different means to arrive at the merciful end he proposes. How many hardened hearts oblige him to speak in thunder and lightning as formerly on Mount Sinai! Lefs terrible means are employed to fave and effect others; with a gentle, mild and perfuafive voice, God calls them to himfelf: he awakens their confciences, and refreshes their souls with the benefi-

cent dew of his grace. Let this conduct of our heavenly Father serve as a model for ours. Let us employ all forts of means to reclaim our fellow-creature, to make him better; but let us particularly endeavour, from the example of God, to gain him rather by kindness than by punishment. Let us imitate the beneficence of the Lord: we see how he refreshes the parched earth with dew; he revives and gives new life to the plants. Let us consider how many of our fellow creatures are in diffress, and languishing for want. Let them not languish in vain: let them not perish. Let us endeavour to revive their hearts with benefits, and to pour as many bleffings on our fellow-creatures as the dew sheds upon the plants.

JUNE XVII.

LIFE AND LABOURS OF THE BEE.

IN the fine days of the present season, in this time of cheerfulness and joy, every thing is in motion; every thing throughout the animal world is full of life and activity; but there are no creatures so active in our service as the little colony of bees. At least it is certain, that of all the insects round us, there are none we can better learn to be acquainted with, or which can

afford a more ufeful and pleasing scene. The bees affemble in great numbers, either in hollow trees and cavities, or in a fort of balkets, called hives, where they are collected by the art of man. They fly about, difperfe on all fides, and, by means of their trunk, they gather honey and wax from the stamina and juice of the flowers. When their harvest is made, they convey it into their store-house, which they fill from top to bottom with cells in form of hexagons. They inhabit fome of these cells; others are defigned to receive the eggs, and to lodge their young; and the rest serve as magazines to deposit their winter's provision of honey in. Amongst these bees, which form altogether but one family, there is one larger than any other, which is a female, and therefore called their queen. her alone all the young bees born in a hive owe their birth. From the eggs she laid in the cells there come out worms, which the working bees feed with their trunk. Afterwards, this worm remains near fifteen days to all appearance dead, in its cell, which is closed with a little wax lid. In this inanimate flate it is called nympha. When its time is accomplished, it opens its tomb, and comes out in the form of a young bee. Befides the queen, there are in each hive two forts of flies, the drone and the working bee. The former are males: they impregnate the queen, and ferve her as a guard. The bees have two horns on their heads, which guard their eyes,

and warn them of dangers. They have fangs or claws they make use of in their work, and a trunk or hollow tube, which they can draw in and out of its case as they please. This instrument, supple and moveable in every way, reaches to the very bottom of the cup of the flowers, where they gather their honey, and paffes through the case into the bag of honey, placed within their bodies, from whence the honey is afterwards poured into the cells of their storehouse. The bees have fix feet. With the two first and their fangs, they form the wax or meal of the flowers into little balls, and with their middle feet they put them into a hollow, (shaped like a fpoon, which they have in their hind feet, which are also furnished with hair, in order to retain the wax, and prevent it from falling when they are flying. Laden in this manner with honey and wax, the working-bees return to their cell, without losing their way, though they are sometimes above four leagues from it. When they arrive, they find other bees waiting for them, to affift them in unloading their booty, and then they all work in common to employ those provisions for the general use of the hive. They ftop every crevice with wax, to keep out any foreign animal; but leave openings for themselves to go in and out. The queen and the working bees have, at the extremity of the body, a sting inclosed in a case, which they make use of to wound or kill their enemies:

but the wound they give is generally fatal to themselves, when the sting remains behind.

Every thing in those little animals must excite our admiration; the formation of their limbs, so regular and so well adapted to their kind of life; the care they take of their young; the art with which their cells are built; their activity, their industry, and intelligence. Let us never pass by a bee-hive with indifference. Let us at least admire them, and perhaps this admiration may lead us to more sublime thoughts. If we love to resect on our Creator, we shall find him here. This interesting scene will lead us to him; and we shall adore his wisdom, his power, and his goodness, in the production of these little creatures.

JUNE XVIII.

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THE EXTERIOR PARTS OF PLANTS.

IN order to form any idea of the inimitable art which appears in the vegetable kingdom, we must go on by degrees. Our understandings are too limited to see the whole together, and to acquire a perfect knowledge of it. We must be content with some observations, and pass progressively from visible to invisible things; from simple objects and individuals, to those of.

greater compass, and more general. Who can indeed take in at one glance the whole of the organization of plants? Let us begin, then, by confidering their exterior parts, and let us first dwell on their roots. They are fo constructed that, by means of the principal root, fibres, and little roots which grow out of it, the plants are fastened to the ground. The pores of the root ferve to receive the watery and nutritive juices which the earth contains. Out of the root grows the stem, to which the plant partly owes its strength and beauty: its form is varied according to the nature of the plant. Sometimes the stem is formed like a pipe, strengthened by different knots curiously placed upon it: at other times the stalk is so weak, that it requires a support round which it may twine itself, and fastens by means of some little hooks. Sometimes also the stem, rising majestically like a firong pillar, is the ornament of the forests, and feems to brave the storm of winds: the branches extend themselves like the arms of the human body, and are very regularly distributed. They fpread and divide into boughs, which are placed collaterally, and in the fame order as the principal branches. The buds which come upon the branches, are nothing but little plants, which being put into the ground, take root there, and become a whole, like that of which they were before only a part. The leaves (that pleasing enlivening ornament of the plants) are

regularly placed round the stalks and branches. Amongst a thousand, there are not two whose leaves are perfectly alike; each has a different make, different out-line, different fize, and different ornaments. The leaves are simple or compound, fleshy or dressed, smooth or indented and curled, The bloffoms of trees, whose beautiful enamel forms one of the greatest ornaments of nature, are not less varied than the leaves; fome are plain and have but one flower, others have feveral; here we fee a vafe opening gracefully; there we fee figures in the shape of a mouth, a helmet, a hell, a star, or a fun: a little farther we observe the papilionaceous, so called, because they a little resemble a butterfly with spread wings. Some leaves or petals are placed carelessly round the plant; others form oircles, bouquets, garlands, &c. round it. From the centre of the bloffom rifes a little pillar, fometimes more than one, which are hollow within, round, and often pointed at top: they are called pistils. Round them there are generally other leffer pillars, called stamina, to support the heads, which are a fort of cases full of very fine powder. How is it possible to describe the delicate texture of many of the bloffoms; the sweetness of their persume, the liveliness, variety, and beauty of their colours! After the bloffoms come the fruit and the berries, which repair the mischief done by the inclemency of the weather, and supply what is necessary

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for the use of men and animals. The berries and fruit contain, under one or feveral coats. the feed of future plants. The outward forms of the fruit and feeds vary as much as those of the leaves and bloffoms. There is fcarce any form that is not diffinguishable in one or other of them. All these parts of plants have their proper use and design : let the smallest part of them be taken away, and the plant will lose fome of its perfection, its beauty, growth, or increase. As extraordinary as it may appear, it is certainly true, that all those parts, without one fingle exception, are more or less necessary to the whole. Try the experiment, take the leaves from a tree, and it will foon wither and perish. It is the same with all the other plants. There is nothing superfluous amongst them; nothing that has not its use; nothing that does not evidently tend to the perfection of the whole. But in discovering this connection, this harmony, this wonderful arrangement of the vegetable kingdom; in feeing that the whole is beautiful, and ordered from general laws, though differently applied, shall we not conclude, that the Author of all those beauties must necessarily have infinite wildom? This consequence is as natural as that we draw, when, on hearing a perfon speak, we conclude that he must be near us. Let us then raife our fouls to the Creator of all things: we shall every where find him. It is for this purpose he formed the plants so magnificently, and thus displays to us their use and beauty. Let the divine wisdom be ever present to us: it will appear in the smallest blade of grass, if we take the trouble to examine it closely. The more we accustom ourselves to reslect on the wisdom of God, the more satisfaction we shall have in contemplating nature: at each slower we behold, we shall cry out with transport, How great is our Creator, how admirable is his wisdom!

JUNE XIX.

HYMN OF THANKSGIVING FOR THE WORKS OF THE CREATION.

To thee, O Lord! from whom proceedeth every bleffing, and who dispenses them so bountifully, to thee belongest glory, honour, and thanksgiving. Thou hearest the cries of the young raven, and takest pleasure in the song of the lark; vouchsafe to listen also to my voice, and accept the tribute of praises due to thee. The least of the creatures formed by thy hand proclaims thy wisdom. The traces of thy goodness and power are seen from one end of the year to the other, and are continually renewing. Each blade of grass declares the greatness of God, and our own nothingness. With parent-

al tenderness thou providest for our necessities. and givest to men and animals their proper food. From dawn to dawn thy bleffings continually fucceed each other, and even the wicked man feels the effect of thy goodness. O God! who is like unto thee I the earth is full of thy goodness and wisdom! Vouchsafe to teach me, O Lord! how to praise thee worthily. Incline my heart to love thee, and let me hereafter live only for him who heapeth fuch bleffings upon me. It is in thy name, and in the hope of thy bleffing, that the farmer fows his corn: it is thou who makest the seed fruitful. This earth, that, for our fins, had a curse laid upon it, is bleffed again by its creator, and bringeth forth fruit plenteously. Thou makest the bosom of the earth fruitful. Thou waterest the furrows of the fields. Thou cloathest the meadows, the valley, and the plain with flowers, with groves, with trees, and herbage. Thou orderest the cool and refreshing dew to moisten our gardens and fields, and to shed fertility and abundance upon them. The barren and dry foil thou waterest with gentle rains. The cold and wet places thou warmest with the rays of the sun. The weather and the feafons thou orderest wifely, and in the manner most beneficial to mankind; and, in the midst of all the viciffitudes of heat and cold, rain and drought, thou coverest our fields with rich harvests, and the wings of Vol. II.

est the tops of barren rocks with grapes. Thou dressest our pasture with clover; and, by thy command, the sountains and streams water the thirsty animals. Thou causest the tree to take root, and it prospers: thou causest a quickening sap to circulate through its trunk, and givest it force to branch out with leaves and blossoms, while the abundance of fruit, under which the boughts bend, prove the pleasure thou hast in doing good. We, therefore, glorify thee, our Creator, our Benefactor! we bless thy holy name!

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caterpillars.

THOUGH these insects are so disagreeable to the lovers of gardens, and so disgusting to overdelicate people, they nevertheless deserve our attention. Caterpillars generally live upon our trees, and we have such an aversion to them, that, wherever we meet with them, we destroy them. This is the reason we do not deign to honour them with a look, and still less to examine them attentively. And yet there is no doubt but these insects may very agreeably amuse an attentive observer of nature. Let us here try to prove it. Perhaps, by raising the curiosity

of those who have hitherto neglected them, they may be induced not to trample them under foot, without at least first observing their wonderful formation, and taking from thence occasion to look up to the Creator .- The number of species of caterpillars already known, amounts to more than three hundred, and there are new ones daily discovering. Their shape, their colour, their form, their inclinations, and way of life, all differ in some respects; but this circumstance they have in common, that they are composed of rings, which, by moving to and fro, carry the body wherever they want to go. Nature has given them two forts of feet, which have each their particular use. The fix forefeet are fort of hooks, which they make use of in taking a fast hold and clinging to any thing. The foles of the hinder-feet are broad, and armed with little sharp nails. With the hooks they draw to them the leaves, the grafs, and whatever they want for food, and they fix the forepart of their body with them while they are drawing up the hind rings. The hinder feet ferve to keep them firm, and to hold by whatever they are to rest upon. When they are on a branch or a leaf, they can feize on food at fome distance; for, by hooking themselves on with the hind-feet, they stand up, and raise the forepart of their body, move it about, and poize it in the air on every fide, get forward

upon the leaf, reach their food, and take it with their claws. However adapted the body of the caterpillar is to its feveral wants, it is remarkable that its state is but transient; that the limbs last but a certain time, and that this creeping worm becomes a chrysalis without feet or motion, till it is metamorphofed into a creature classing with the inhabitants of the air. Were it for this reason only, the caterpillars would be worth our attention. Towards the end of fummer, (and often fooner,) after having fatiated themselves with greens, and after having changed their coat feveral times, they ceafe to eat, and begin to build a house, in order to end their life in it, (with the caterpillar state), and to be afterwards transformed into butterflies. The chryfalis is full of a fort of thick milk, which ferves for food to the butterfly till it comes out. When it is entirely formed, and its parts arrived at confishency, and that a gentle warmth invites it to quit it's prison, it makes itself a passage through the end of the chrysalis that is largest, and at the same time the thinnest. The head (which has always been turned towards that end) disengages itself, the horns lengthen, the feet and wings spread out, the butterfly takes wing and flies away. It preserves none of its former state. The caterpillar which changed into the chryfalis, and the butterfly that comes out of it, are two animals totally different. The former was rough, hairy, and often hideous: the other is adorned with the livelieft colours. The former limited itself to a gross food; the latter goes from flower to flower, and freely enjoys all nature, of which it is itfelf the ornament. Will not this description reconcile every one to these insects, and put an end to all aversion to them. Perhaps some may still think they have a right to ask, To what purpose, after all, are these caterpillars? Would it not be better to be entirely free from them? No. On the contrary, it is certain, that the world would not be as perfect as it is, if there were no caterpillars in it. Take away these infects, and you deprive the birds of a confiderable part of their subsistence. As the birds were to feed on caterpillars, it was just that the Creator should ordain for their food the leaves and plants to which they have as good a right as us. It is true, that the voracity of these animals makes them fometimes troublefome to mankind; but this is an evil which the Creator permits with much wisdom; for the mischief the caterpillars fometimes do us, may ferve to humble us, and make us recollect the uncertainty of all our earthly possessions. And even, supposing we could not penetrate into God's reasons for forming fuch creatures, we should not therefore have a right to deny their utility. We ought, on the contrary, to take occasion from thence to acknowledge our ignorance, and trust to the wifdom of God.

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JUNE XXI.

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THE BEGINNING OF SUMMER.

I HIS day summer begins. Many of us have often feen the changes occasioned by this day throughout all nature: but is it known how it happens that the fun remains fo long afterwards above the horizon? why this is the longest day of the year; and why, in reckoning from this time to the end of autumn, we perceive the heat and length of the days diminish in equal proportion? All these changes are owing to the annual course of our globe round the sun. When that body enters into the fign of Cancer, the earth is so situated, that all its northern side is turned towards the fun; because the Creator has inclined the axis of our globe towards the north, and it preferves that direction invariably. On this direction, and on the constant parallelism of the axis, depend, properly speaking, the changes of the four seasons of the year. Let us here reflect a moment on the goodness and wisdom of God, in thus inclining the axis of the earth. If it had been in a perpendicular

direction, our globe would have been a very melancholy habitation, either for plants or animals. Neither growth nor diminution of days could take place, nor the feveral changes of the feafons. How much to be pitied should we be, who live in Germany, and confequently near the north! The air we should breathe would be always as sharp as in March or September, and our foil would afford nothing but a little mofs and grass. In a word, the greatest part of the two hemispheres, would be but a frightful desart inhabited only by a few infects. In our climate, nature has at this time almost ended her annual work. She has already loft fome of her variety. Nothing can be more green than the vines, the orchards, and the forests; but the shades of colour are not fo pleasing as they were. The meadows begin to whiten, and their flowers are mowed down. The corn infensibly grows yellow, and the number of colours diminish. The variety and brightness of them, the various notes of numberless birds, had before all the charms of novelty, and afforded us the most pleasing fensations; but now the nearer we approach to autumn, the more these enjoyments diminish. The nightingale is filent, and the great heat: makes it inconvenient to walk. Do we not here feen an emblem of life? Are not the pleafures we enjoy equally transient! Even the most innocent of them, such as nature in the beauty of fpring prefents to us, are liable to change and

give place to other objects. What we at present observe in the summer of nature, we may obferve in the fummer of life. When we have attained our fortieth year, which is the beginning of a riper age, the world lofes part of its charms, fuch as delighted us in our youth; and, when we approach the autumn of life, we become a prey to cares, and are less calm, less serene, less lively, and joyous than we were. We observe that our strength of body infensibly wears away with age. In fine, there come days, when we fay, I no longer take pleasure in them. But with what a lively sense of joy do I, at this moment, raise my foul towards God, who is the Father of all. and the centre of felicity! Perhaps, it is for the last time that I have contemplated, in this world, the charms of nature. I will, therefore, enjoy this fummer as if it were to be my last. May I live so as never to regret having so often seen the return of the feafons.

JUNE XXII.

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THE NIGHTINGALE.

THE nightingale is a fongster of the first rank amongst the inhabitants of the air. When all other birds, at the close of the day, have ceased to

entertain us with their notes, it is then that the voice of the nightingale is raised to animate the woods and groves. When we listen to the brilliant founds of the voice we are apt to conclude that the bird must be large, that the throat must have great strength; and the inimitable charm of her melodious notes, makes us prefume she furpasses all others in the beauty of her form. But on the contrary the nightingale is a bird of poor appearance, whose colour, form, and the whole of its exterior, is void of any thing attractive or majestic, and has nothing in the least distinguishing. Nature has, however, compensated for its plainness by giving it a voice irrefiftibly charming. Liften to its fine long quivering notes; what variety, fweetness, and brilliancy in them! When she begins her song, she seems to study and compose before hand the melodious notes she wishes to produce. She begins foftly: then the notes swell gradually till they run with the rapidity of a torrent: she goes from ferious to gay: from fimple notes to the wildest warblings; from the lightest turns and shakes to languishing fighs; and has, throughout the whole, the art to please the ear.

This bird may give rife to many useful and edifying reflections: for example, we learn this truth from it, that homeliness of body is sometimes united with every estimable qualities, and does not exclude beauty from the soul. How

unjust then are those, who only attaching themfelves to the features of the face, and to exterior qualities, praise or blame nothing but what strikes their fenfes, and despife those who have bodily defects. Let us learn to judge with more equity. Any man, though deprived of the advantage of figure and fortune, who proves himself by his conduct to have the foul of a fage or a faint, is by much the most worthy of our esteem. It is the perfection of the foul only that gives true merit to man, or is worthy of our admiration; the rest can only seduce those who do not know the value of wisdom and virtue. Have we not often known persons, neither distinguished by rank or exterior qualities, who have done the greatest services to church and state? Crooked and deformed people have often shewn more greatness of foul, than others possessed of the most beautiful person and finest form. It is a lesson not to trust to appearances. Those we despise may often prove to be superior to ourfelves.

When we hear the skilful harmony of the nightingale, does it not naturally lead us to the Creator from whom she has this talent! What wisdom there must be in the formation of this bird, to make it capable of such sounds! Lungs so delicate as those of the nightingale, the motions of which are so violent, must be easily wounded, if they had not the singular advantage of being sastened to the back-bone by a number of little

large, and that is certainly what most contributes to the variety of those sounds, which, in charming the ear, fill the soul with sweet and serene joy. Is it possible not to trace a divine Wisdom and Providence in this; and will not even the song of the nightingale lead us to the Author of all nature. Lovely songstress! I will not leave thee, till I have learned from thee the art of praising thy Creator and mine. Pour, with thy song, gratitude and joy into the hearts of the many insensible mortals, who, even at this cheerful season, contemplate the beauties of the creation with indifference.

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THE PLEASURES WHICH SUMMER AFFORDS
TO OUR SENSES.

SUMMER has inexpressible charms, and gives us daily proofs of the infinite beneficence of our Creator. It is the happy season in which God pours out the treasures of his blessings in the greatest abundance on every living creature. Nature, after having revived us with the pleasures of spring, is continually employed, all the summer, in providing for us every thing to please our senses, to supply our wants, and awaken in our hearts just sentiments of gratitude. Before our eyes there grows (by virtue of the seems

laws of nature,) an innumerable quantity of fruit in the fields and gardens: fruits, which after having pleafed the fight, may be gathered and preferved for our food. The flowers afford the most agreeable variety to our senses; we admire their rich drefs, and the inexhaustible fertility of nature in the multiplicity of their fpecies. What variety and beauty also in the plants, from the humble moss to the stately oak! If we go from flower to flower, the eye will never tire. Let'us climb the highest mountain, feek the cool shade of the woods, or defeend into the valley, we shall every where find new beauties. A multitude of objects strike our eyes at once, all different from each other; but each in itself has charms enough to fix our attention. There we see innumerable flowers; here living creatures of different kinds. If we lift up our eyes, they are delighted with the blue fky: if we cast them on the ground, they are refreshed by the beautiful verdure with which it is cloathed. Our ear is charmed with the cheerful notes of the winged fongsters; the variety and simplicity of their melody fills the foul with the fweetest sensations. The murmuring of the brooks, and the filver waves of a fine flowing river please both the ear and eye. It is to indulge our tafte that the strawberries and other pleafant fruit ripen; while at the fame time they cool the blood. Our barns and granaries are filled with the new productions of the fields and

gardens, which afford us the most wholesome agreeable food. The smell is struck with the fweet perfume that exhales on every fide. In a word, a thousand pleasing objects affect the fenses, and touch the heart. Numerous flocks feed on the profusion of bountiful nature; and eat wholesome herbs, and procure us pleasant wholesome milk and nourishing meats. Abundant rains moisten the ground, and open to us new fources of bleffings. Lofty trees and groves afford us a delightful shade. All that we see and hear, all that taste or fmell can convey, multiplies our pleasures, and contributes to our happiness. But the creation is a still greater, and more enchanting object for the mind, than for the fenses. In points, which the latter cannot reach, the mind discovers beauty, harmony, variety, and new enjoyments. continuent and of the service and only engineering

JUNE XXIV.

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A SKETCH OF THE INWARD PARTS OF THE HUMAN BODY

THE more difficult it is to acquire a knowledge of the infide of the human body, the more necessary it is to make use of the information with which we are furnished by skilful anatomiss. It is with this design that I am going to give a short description of those parts.

The construction of the Heart which is placed near the middle of the breast, and is the moving principle of the whole machine, is worthy of admiration. It confifts of mulculous fibres curiously interwoven. Two cavities separated from each other by a partition, and which are called Ventricles, are formed in the infide of this organ. As the heart continually dilates and contracts itself, and expels from the lungs the air which it receives through the nofe and mouth, this is what occasions our breathing. The lungs are of a fpungy substance, which like the bellows extend and contract, in order to draw the air in and let it out again. They swell out on both fides, and fill almost the whole space of the breast, to refresh it with the air it draws in, and at the same time to prevent the blood from too. much attenuation. The breast is lined with a fine membrane called Pleura. Under the lungs : is placed the Stomach which receives and digefts: the food. It is shaped like a purse. On the right fide is the Liver, which covers one fide of the stomach, and by its warmth assists the digeftion. It separates the bile from the blood, which collects in a particular vehicle, and descends into the bowels. The irritation it occasions there. facilitates the passage of the excrements. Oppofite to the liver is the Spleen. It is a foft bag which stretches easily. The blood is conveyed

into it by arteries, and flows out of it through the veins. Behind the liver and spleen are the There are two of them, one to the right, the other to the left. The use of them is to separate from the mass of blood the humours which overflow into the bladder. Under these parts are placed the Entrails joined to the mensentery. They complete the separation of the digested food, and serve to expel the grosser parts of it out of the body. The Mesentery is a great membrane which folds feveral times over and forces the entrails to fold themselves in the fame manner. There are a great quantity of little veins as fine as a hair upon the mefentery. They are called Milky Veins, because they contain a juice refembling milk. In the middle of the mefentery there is a large gland, where the milky veins meet as in their centre. A skin; full of folds, of glands, and mufcles, covers over all the entrails. That part of the body called the Belly, and which begins at the stomach, is separated from the breast by the Midriff. It has feveral openings to let the veffels pass which are to descend to the lower parts. The liver and spleen are fastened to it; and the shaking of it not only occasions laughter, but serves. also to disengage the spleen from the humours. which incommode it.

These are the principal parts of the breast and belly; independent of which there are several others which communicate with them. At the

beginning of the neck is the Windpipe and Weafand. The Œfophagus is the channel through which the food paffes to the stomach. Through the weafand the air penetrates to the lungs. Whilst the lungs are sending back the air through this channel, the voice forms it felf at the fame time the breast throws off the superfluous humours. At the entrance of the weafand there is a little lid, which opens to give passage to whatever is to go out through that pipe. The lower orifice of the stomach is provided with such another cover, which opens when the food preffes upon it, and then closes upon it to prevent its rifing up again. In the upper part of the head is placed the Brain, which is capable of receiving impressions from exterior objects. The whole mass of the brain is covered with two thin transparent membranes, one of which, called the Pia Mater, is the first envelope. The second, called Dura Mater, is interwoven with arteries and veins. Independent of these parts, each of which have their fettled place, there are others fpread throughout the whole body, fuch as the bones, the arteries, veins, lymphatic veffels, and nerves. The Bones fet in their joints, partly ferve to support and give the power of motion to the body, and partly, to preferve and guard its noble parts. The Arteries and Veins are mixed throughout the whole body, in order to nourish it with the blood they convey to every part. There are also several Lymphatic Vessels, which generally join to certain glands, and receive a transparent yellow liquor, which they afterwards let flow throughout the body. The nerves, of which they reckon ten principal pair, are little fibres fpringing from the brain, and from thence are spread over the whole body to the very extremities of it. Some suppose they are hollow, and contain a fort of marrow, like that of the brain. The nerves are the organs of the fenfes and of all the motions of the machine. All those parts are pierced with holes, in order to let the light and fubtile matter (and whatever is fuperfluous in the body) evaporate. These orifices are called pores. The fame wisdom, so vifible in the inward and folid parts of the body, is equally fo in its fluid parts. The blood, the chyle, the lymph, the marrow, the bile, the nervous juices, and the different forts of viscous and gelatinous humours, supplied by innumerable glands, their feveral properties, their defign, their effects, the manner in which they are prepared, filtered, and separated from one another, their circulation, their preparation, all thefe prove the most astonishing art, and the most profound wifdom.

Let us sum up what has just been said in regard to the interior construction of the human body.

—The bones, by their solidity and their joints, form the soundation of this sine machine. The ligaments are strings which unite the parts together. The muscles are sleshy substances which

act as elastic springs. The nerves, which are dispersed over the whole body, connect all the parts together. The arteries and veins, like rivulets, convey life and health throughout. The heart, placed in the centre, is the focus, or the acting power, by means of which the blood circulates and is preserved. The lungs, by means of another power, draw in the outward air, and expel the hurtful vapours. The stomach and intestines are the magazines where every thing that is required for the daily supply is prepared. The brain, that feat of the foul, is formed in a manner fuitable to the dignity of its inhabitant. The fenses, which are the foul's ministers, warn it of all that is necessary either for its pleasure or use.

Adorable Creator! with what wonderful art hast thou formed us!

JUNE XXV.

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FROM the many experiments made in our time, no body any longer doubts the existence of electrical fire, the fingular effects of which have fixed the attention of all Europe for above thirty years. It is proved, that this fire is diftributed equally throughout all bodies; but it is,

like the air, not perceptible to our fenfes but when put in motion. It is also necessary that, when the balance is interrupted by any cause whatever, it should be restored, before we can fenfibly perceive the electrical fire. Two different forts of bodies must be marked or distinguished in this case. The one fort is such by nature, that the electrical fire can be produced in it, and increased by means of friction. The others receive their electrical force, not by friction, but by communicating with the first. Those of the former class are chiefly glass, pitch, rofin, fealing-wax, filk, hair, and the air. All other bodies, but particularly water and metals, belong to the fecond. The bodies of the first kind are capable of preserving the electrical matter collected in them. Those of the second, on the contrary, lose it as quick as they receive it. Machines have been invented, in which, by means of a great wheel, a rapid motion is given to a glass globe, which, in turning round, rubs against the hand, or against a cushion. By the effect of this friction, the globe preferves its electrical force, which may be extended as far as is defired, by means of iron bars or chains, which communicate with the glass globe. If we put our hand on one of these bars, we receive a shock, and, if it is dark, we see bright sparks of fire come from it. If feveral persons together form a circle, holding each other by the hand, they will receive the

electrical stroke at the same moment, which stroke may be made more or less violent as they please. There may be given to electrical fire fufficient force to kill, not only sparrows and other little birds, but hens, geefe, ducks, and even sheep. This experiment takes place by means of large glass bottles, filled with water, and tied together with metal chains, which fasten them also to the glass globe, put in a state of friction, as mentioned before. The water conveys a great quantity of electrical matter into the infide of the bottles, and, at the fame time, their outer furface loses an equal quantity of it, by means of the water which is without. A violent flash, a great explosion, the combustible matter taking fire, and the death of the animais, are the consequence of this experiment. There are others also which are common to all these forts of experiments, such as fulphureous smell, an agitation of the air, and a new property of the electrical matter. It has been observed, that some experiments failed, because the iron bars, which were to serve as electrical conductors, were too angulous and too much pointed. It was suspected that the electricity lost its force by the points: this idea was confirmed, by putting the face or hand near the point of the bar, when it could be diffinctly perceived that there issued from it a torrent of electrical matter. It was from thence concluded to be possible, that those points which ejected

electrical matter might also serve to attract it, and many experiments have proved the truth of this conclusion.

If any one should think these observations of no importance, let them consider that we may learn more and more the use of this extraordinary phenomenon of nature, from which a double use has already been drawn. The phyficians have joined electricity to their art; and there are examples of its having cured paralytic limbs. Naturalists also have discovered a great analogy between lightning and electrical fire, which has given rife to new opinions upon the manner in which thunder is formed, and has changed the former ideas on that subject. Thus, from time to time, we receive new folutions of the mysteries contained in the great works of our Creator. How limited are the views of man! and how little attention is paid to important things placed before our eyes, fince the phenomena just mentioned were for many ages unknown; and, even now, how little are we acquainted with nature! and how much have we not yet to learn!

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JUNE XXVI.

THE MANNER IN WHICH THUNDER FORMS

FORMERLY, and even at the beginning of this century, it was thought that thunder proceeded from the inflammation of falts, of fulphureous matter, and other substances in the air. It was imagined that there was the greateft resemblance between the effects of fire arms and that of thunder and lightning. However, all the explanations, by which they endeavoured to establish this system, were not sufficient to remove the difficulties which opposed it, or to account for the supposed effects. But fince the phenomena, produced by electrical fire, have been observed with attention, it has authorised us to affign a very different cause for thunder. The perfect refemblance there is between that and electricity, has convinced the naturalists, that they are the fame, and that electricity is in our hands what thunder is in the hands of nature. The latter executes in the great, what we imitate in the little. It will not be difficult to convince even those who have not studied natural philosophy, if they will only take the trouble to compare the effects of thunder with those of electrical fire. The effects of thunder appear by loud noise heard at a distance, and by conflagration. Buildings that are struck with it

are fet in flames. Men struck with it are blackened and burned. Sometimes, however, there is no trace of fire, and it is the blow that occafions death. Their cloaths are all torn to rags. The lightning casts them to a distance from the place they were in; and part of the body that has been struck is often pierced with holes. Sometimes large stones are broken by lightning, and it destroys the ground it falls upon. Electricity produces the same effects, but in a leffer degree. When, by means of water, its force is increased, the electrical lightning is followed by a very strong commotion. Very compact bodies are pierced with holes; birds and other little animals are killed by it; and every electrical flash is attended with a loud noise. That torrent also of fire, which flies off histing from the point of electrified bodies, is one of the phenomena which is found in lightning. And, in regard to its swiftness, there is still a greater refemblance between thunder and electricity. If. during a florm, a fword or chains is hung up in the air by filken strings, they become electrical. If we put our finger near it, there will come out of it sparks of fire, more or less, in proportion to the degree of storm, or our distance from it. In a word, all the effects of electricity appear during a storm. After such experiments, it can no longer be doubted, that the air is electrified when there is a fform, and that thunder and lightning are the effects of a violent elec-

trical fire. Thus all that appeared wonderful and tremendous in these natural phenomena. disappear by degrees, as we become better acquainted with the laws of nature. Every one. confequently, ought to have a general knowledge at least of the first principles of natural history. Superstition and fear, which often mix with our observation of nature, would soon be at an end. if we either resolved to reslect upon it ourselves with more attention, or to confult others who are well informed upon the subject. Let us make use of what we have acquired in respect to the nature of thunder, fo as to banish the dread and horror which fo strongly seizes our minds at the approach of a storm; and let us always look up to, and trust in that God who alone worketh fuch great marvels. For, though we can affign as causes of thunder, the just and invariable principles drawn from natural philosophy, it is not, therefore, the less wonderful. There are even some circumstances of it that will ever be inexplicable to the most penetrating understandings. It is enough for us to know, that the nature of the air, and of the whole atmosphere which furrounds us, renders this phenomenon necessary; that the storms in the hands of God are a means of making the earth fruitful, and, therefore, ought to incline us to pay a tribute of adoration and gratitude to our Creator.

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J U N E XXVII.

Herrings.

HIS is the feafon in which they begin to fish for herrings on the coasts of England and Scotland; by which means we shall receive, in a short time, a great quantity of these fish, which feed the poor as well as the rich during the whole year. Let us examine what is most important in the natural history of these fish. Innumerable shoals of herrings live in the frozen fea, near the arctic pole; but at a certain period they quit that place, and come in multitudes to the coasts of England and Scotland. It is not yet positively ascertained, what may be the cause of this emigration. Some think it is to avoid whales and other great fish in the frozen seas; others imagine, that the prodigious increase of the herrings obliges them to take thefe long voyages, and to divide into separate colonies, left they should be in too great quantities to find fufficient food in the northern feas. Perhaps also it is the defire of propagation, and a peculiar instinct, which leads them to the places most favourable for the increase and preservation of their race. It is certainly these reasons in general, that occasion such shoals of herrings to quit the north at the beginning of the year; for, in the month of March, a wing of their army had VOL II.

already reached the coasts of Iceland, and it was their western wing. The herrings are at this feafon fo plentiful there, that by putting the shovel, with which the sails are watered, into the sea, there are great quantities of them taken up at a time. The eaftern wing advances farther into the Baltic fea. A part of it turns towards the Cape North, fails along the coasts of Norway, and enters through the fouthern straits into the fea. Another part gains the northern point of Jutland, then enters into the Zuyder Zee, and from thence passes again through the Baltic fea, in order to return to the place from whence it fet out. But the largest detachment of the eastern wing is that which turns to the western coast, in order to go directly to the Orkney islands, where the Dutch catch them. Towards the eighth of June the fea, in those parts, is full of herrings. They then direct their course towards Scotland and England, where they fill all the bays, and the mouths of the rivers with their fry. After having quitted England, they probably return into the north back to their own country: at least they disappear, and we know not what becomes of them. The prodigious multitude of these fish is surprising : one fingle herring lays at least ten thousand eggs in the sea, near the British coasts. This great fruitfulness makes what is faid of the Dutch fiftery credible, where there are annually caught about two hundred millions of herrings. A

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to p qual which fishery which supports numbers of people, and increases the revenue of the Dutch above twenty millions of crowns.

It is but just that we should lift up our hearts to the almighty and beneficent Creator, who, by a guidance sull of wisdom, causes these sish to fall into the hands of man. By how many different ways he provides for our support! The seas, the lakes, and the rivers are subservient to us, and contribute to our preservation.

JUNE XXVIII.

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ECLIPSES OF THE SUN AND MOON.

IT is shameful that, in an age so enlightened as ours, not only the multitude, but even those who pretend to be superior to the common people, should be still so ignorant in respect to those bodies. From thence proceed the superstitious notions which are raised by eclipses of the sun and moon. If any one took the trouble to enquire into the cause of them, it would be found how absurd it is to shut up wells during an eclipse, to prevent the water from acquiring any nauseous quality, or to take other superstuous precautions, which are melancholy proofs of the ignorance of mankind. Let us then examine into this

phenomenon, because it is in itself very remarkable, and furnishes us with new occasions to praise our great Creator. The eclipse of the sun is an effect entirely natural. It is caused by the moon passing between the earth and the fun. But it can only take place when the moon, which is an opaque body, and dark in itself, comes nearly in a direct line between the fun and. our earth. It then conceals from us part of that globe, or the whole of it. The former is called, in the almanacks, a partial eclipse, the latter a total eclipse. Thus, the folar eclipse is nothing more than the fituation of the earth when the moon passes between it and the fun, interrupting the folar rays. We must not imagine that the fun is at that time really darkened: it is only concealed from us. It retains its usual splendour; and all the difference is, that the rays which iffue from it cannot reach us, because the moon is placed between the fun and our globe. This is the reason that a solar eclipse is never vifible at the fame time in all parts of our earth; for, unless the sun had really lost its light, the eclipfe could not be visible at the same time in every point of the hemisphere. It is, on the contrary, always more in one country than in another, and, in some places, it is never seen at any time. The moon not only darkens our earth fometimes, but the latter also casts its shade upon the moon, and by that means intercepts the rays of the fun from it, either wholly,

or in part, and this is called an eclipse of the moon: but it can only be when the moon is at one fide of the earth and the fun at the opposite side, and consequently when it is full moon. As that planet is really darkened by the shadow of the earth, the eclipse is perceived at the fame time on all the points of an hemisphere of our globe. Some people may ask, what the use is of eclipses of the sun and moon? To those even who only calculate the use of natural. things from the immediate advantage that accrues to them, the eclipses are of importance. It is by their means, that the true position and distance of towns and countries are known, and it is from thence that we have been able to trace accurately the geographical maps of the most remote countries. Eclipses, if well observed, ferve also to confirm chronology, and to direct the navigator, by shewing him how far he is from the east or west.

However inattentive we may be to the importance of these advantages, they are not the less essential to us.

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JUNE XXIX.

THE STALK OF THE WHEAT.

W E fee that the wheat is growing every day, that the tender ears of corn are insensibly ripening in order to furnish us, some weeks hence, with wholesome bread. A precious bleffing with which nature rewards the labour of man. Let us cast our eyes on a field of wheat. Let us calculate the millions of ears of corn which cover one fingle field, and let us reflect on the wifdom of those laws which procure such an abundance for us. How many preparatives were neceffary to furnish us with this most indispensible of all food! How many progressive changes were to take place in nature before an ear of corn could fpring up! It is now almost ready to produce its fruit, and invites us to reflect on its construction. When the grain of wheat has been some time in the ground it shoots upwards a ftalk, which rifes perpendicularly, but only grows flowly, that the wheat may have time to ripen. It is for very wife reasons that it grows four or five feet high, in order to preserve the grain from the moisture of the ground, which would rot it. The height of the stalk contributes also to the depuration of the nourishing juices which the root conveys to it; and its round form affifts this operation; for, by that means the heat penetrates equally into every part

of the stem. But how is it possible that so slender a stalk can support itself, and bear up its fruitful head, without finking under the weight, or without being beat down by a breath of wind? The Creator guarded against this inconvenience in the formation of the stem. He furnished it with four very strong knots, which in some measure serve as skrews, strengthening it, without taking from it the power of bending. The confiruction of these knots alone shew the greatest wisdom. Like a very fine fieve they are full of little holes, and through these orifices the juices rise up, and the heat of the fun penetrates into them. The heat attenuates the juices which collect there, and purifies them, by making them pass through a fort of The stalk is liable to be beat down by storms and heavy showers of rain, but its not being thick fecures it. It is flexible enough to bend without breaking. If it were harder and fliffer, it might certainly refift all weather, but would it then ferve as a bed for the poor?

From out the chief stem there shoots others not so high, as well as leaves, which, collecting drops of dew and rain, surnish the plant with the nutritive juices it requires. In the mean time, the grain, that essential part of the plant, forms itself by degrees. To preserve these tender sprouts from the accidents and dangers which might destroy them at the instant of their birth, the two upper leaves of the stalk unite

closely at the top, both to preserve the ear of corn, and to draw to it the nourishing juices. But as foon as the stem is formed enough to supply the grain of itself with proper juices, the leaves gradually dry and drop off, that none may be taken from the fruit, and that the root may have nothing more than necessary to nourish it. When this scaffolding is removed, the edifice appears in full beauty. The bearded corn waves gracefully, and its points ferve for ornament, as well as defence against the birds. Refreshed with gentle rains, it thrives till the appointed time, giving the farmer fine hopes, and growing every day more yellow, till finking at laft under the weight of its riches, it bends its head of itself to the fickle.

What wonderful wisdom and power appear in the construction of one single ear of wheat, and yet we seldom pay attention to it, because it is daily before our eyes. But what other proof of goodness can the Creator give us, if we are insensible to this. Ungrateful, thoughtless man! open thy heart to the sweet sensations of gratitude and joy. As long as thou art capable of contemplating a field of corn with indifference, thou wilt be unworthy of the food it furnishes in such abundance. Learn to think as a man, to enjoy the noblest pleasure a mortal is capable of in this world, that of tracing thy Creator in every creature.

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JUNE XXX.

THE BLIGHT.

be the lame : HAT is the name given to those insects which fettle upon the stalks and leaves of plants. in fuch fwarms, as to cover them fometimes all over. There are as many species of them as plants; and they are more worthy our attention than any other infect, on account of the fingularities in them. What distinguishes them in the first place from any known species of animals is, that they not only lay eggs, but also produce young ones alive. In the heat of summer they are viviparous, that is to fay, that the young ones come from the mother's womb completely formed and alive: undoubtedly because the plants at that time furnish them with nourishment. Towards the middle of autumn they lay eggs, which are not hatched till the fpring following; because if the young ones were produced. fooner, they would perish for want of food. Precifely at the period when the females begin to lay, the males appear; which feem to indicate that their existence was not necessary till then. This supposition is fully confirmed by many ex-If one of the blights is taken at the periments. moment of its birth, and shut up in a glass by itfelf, it will (thus fequestered,) engender another like itself when it acquires a certain degree of

growth; and it will, at the end of a few days, be furrounded by a numerous family. experiment is repeated on one of its young, and even for many generations, the refult will still be the same: and it is certain that these animals engender separately. Let us observe another fingularity: in some species of infects, the males have wings, and the females are without any. In the blight, the two fexes are alike, either both produced with them, or both otherwise. Those with wings are so small in comparison with the others, that they walk over them as they do upon fruit. This remarkable instance of what may be called fingularities in nature, an instance so contrary to the common rules, and in which we, nevertheless, discover such wife defigns, leads us naturally to inquire why there are fingularities in nature; and what could induce the Creator to deviate sometimes from the common laws? In order to answer this question in a fatisfactory manner, we ought to be able to take in the whole of all that is created; to know at the same time all the parts of the immense kingdom of nature, and the connection between each, before we should be capable of judging in what, or how far any thing can be useful or hurtful to the whole. But fo deep a knowledge of nature being denied to our weak faculties, let us content ourselves with general arguments, which may in some measure ferve to solve that question. In the first place, God shews us, by

these fingularities, the command he has over all nature. He is the fupreme Lawgiver, who affigns to every being, the law he is inviolably to observe. He, to whom every being is sub-ject, has a right to prescribe such and such rules; but he has also the power to suspend his rules, and make what exceptions to them he pleases. Secondly, We find a great variety in: nature. It is easy to conceive how much the exceptions to the general rules increase this variety, and confequently the pleafure of the obferver, as well as the admiration for the Author of nature. Thirdly, Experience teaches us, that the objects we have daily before our eyes. become familiar to us, and their impression so often repeated, leaves us cold and infenfible to them. The glorious fun of nature itself does not always interest us; because we have taken the habit of passing over things lightly, which we see continually. Therefore, every lingularity, every extraordinary phenomenon is a fresh: inducement to contemplate the works of God. and ferves to rouse us from our indolence. Fourthly and lastly, The fingularities of the: physical world, which, far from hurting the perfection of the whole, enter into the plan of divine wisdom, teach us, that the singularities of the moral world, and the fate of mankind, are, equally under the direction of an all-wife Being, who will order all things fo as to answer his mercuul designs.

JULY I.

FOREIGN PLANTS.

ALL our corn and a great number of our vegetables come from foreign countries, and generally from warmer climates than ours. Most of them from Italy. Italy got them from Greece, and Greece had them from the East. When America was discovered, a great number of plants and flowers were found there, which were till then unknown, and which have fince been transplanted into Europe with much success. The English still take a great deal of trouble, at this time, to cultivate the North American plants in their country. Most of the different forts of corn, of which men and animals make their best food, are grass plants: but, though our fields are now covered with them, they are foreign to us. Rye and wheat are indigenous in Little Tartary and Siberia, where they still grow without culture. As for barley and oats, we are ignorant indeed from whence they come, but it is certain they are not indigenous in our climate, or it would not be necessary to cultivate them. Rice is the produce of Ethiopia, from whence it is conveyed to the East, and afterwards into Italy. Since the beginning of this century, it has been cultivated also in America; and they now send us from thence, every year, veffels entirely lader with

those useful seeds. The buck-wheat comes originally from Asia: the Crusades made it known in Italy, from whence it came into Germany. Most of our herbage and vegetables also have a foreign origin. Borage comes from Syria, cresses from Crete, colliflower from Cyprus, and asparagus from Asia. We are indebted to Italy for the chervil. Aneth comes from Portugal and Spain, fennel from the Canary islands, annise and parfley from Egypt. Garlic is the produce of the East. Shallots come from Siberia, and horse-radish from China. We owe the kidney-beans to the East Indies, the gourds to Astracan, the lentils to France, the potatoes to Brazil. The Spaniards found tobacco, at Tobacco, a province of Jucatan in America. The ornaments of our gardens, the most beautiful flowers, are also foreign productions. Jessamine comes from the East Indies, the elder-tree from Persia, the tulip from Cappadocia, the dasfodil from Italy, the lily from Syria, the tuberose from Java and Ceylon, the carnation and pink from Italy, the after from China, &c.

Let us reflect, with joy and gratitude, on these many and bountiful gifts of God. With what goodness he provides for our happiness and enjoyment, by making even the most re mote countries contribute towards it! But let us, at the same time, learn the constitution of the globe which we inhabit. There is an universal transmigration over all the earth. Men, animals, and vegetables, transplant themselves, and go from one region to another, and this transmigration will only end with our globe.

JULY II.

THE TRANSFORMATION OF THE CATERY PILLARS.

1 HE transformation of the caterpillars into butterflies is certainly one of the most wonderful phenomena in nature, and deserves our attention on many accounts. The manner in which the caterpillars prepare for their change is very extraordinary. They do not, all at once become butterflies, but pass to it by a middle state. After having three or four times shed its coat, the caterpillar strips itself of its last skin, and becomes a substance, which does not in any thing refemble a living creature. It is wrapt up in a bag called a chryfalis, or nympha, and which is somewhat like a child in swadding The caterpillar remains in that state. one, two, or three weeks, fometimes fix months, till at last it comes out of this kind of sepulchre under the form of a butterfly. There are, properly speaking, two forts of butterflies; the wings of the one are raifed, and those of the other are flat; the former fly by day, the latter by night, in general. The caterpillar of the

night butterfly spins itself a bag, and shuts itfelf up, or buries itself in it, when the time for its transformation draws nigh. Those that are to be day butterflies hang themselves up in the open air, on a tree, a plant, a wall, or fome fuch thing. For this purpose, they make themselves a small web with very fine thread, and then, turning themselves upside down, they fuspend themselves so that their heads are a little turned towards the top. Some of these, and particularly those we call hairy caterpillars, remain in that state, hanging perpendicularly with their heads down. Others spin themselves a thread, which goes round the middle of their body, and is fastened at the two sides. It is in one or other of these two ways, that all the caterpillars of the day butterflies prepare themfelves for the great change they are to undergo. Thus, both forts of caterpillars bury themselves in a manner alive, and feem to wait patiently the end of their caterpillar state, as if they forefaw, that, after a short repose, they were to receive a new existence, and would appear again under a brilliant form.

The death and refurrection of the righteous may well be compared to the transformation of the caterpillar into the butterfly. To a true Christian, death is but a sleep, a soft repose, after the pains and misery of this world; a mere moment, in which he is only deprived of motion and life, in order to appear again in glory,

and to enter into a new and better existence. What is a caterpillar? A creeping worm, blind and despised, which, while it drags on its life, is exposed to numberless accidents and persecutions. Is the lot of man in this world much better? The caterpillar prepares, with great care, for its transformation, and that state of weakness and insensibility in which it is to fall for a short time. It is exactly the same with a good man. He prepares a long time before his death for this great change, and he waits with joy and tranquillity for the happy moment, in which he is to enter into a better state. The fleep of the caterpillar does not last for ever; it is only the forerunner of a more perfect state. After its formation, it appears in a more beautiful form. It crawls at first upon the ground; it then takes wing, and flies into the air. first fight, it was blind; it afterwards receives fight, and enjoys a thousand agreeable sensations unknown to it before. It formerly fed flupidly on gross food; it now goes from flower to flower, living on honey and dew, and continually varying its enjoyments. In all this we behold a lively image of the death and refurrection of the righteous man. His weak earthly body appears again in a glorious state of perfection, after his refurrection. As a mortal, he was attached to the world, subject to passions, taken up with fenfual and earthly objects; but, after his refurrection, his body is disengaged from

this earth: he hovers over millions of worlds. and, with a clear and distinct view, he takes in all nature at once. His mind foars infinitely higher still; he draws nigh even to the Deity, and gives way even to the most sublime meditations. Before his death, he was blind in the pursuit of truth; now, he sees, and can behold it, in its full lustre. His body being spiritual and incorruptible, he no longer requires gross food to satisfy his hunger. Very different fensations now form his happiness, and his heart overflows with purer joys. What an important lesson is this for us? If such is the happy change we may expect, let us early prepare for it. If our present state is but transitory and imperfect, let us not make it our chief object, and let not the moments we are to pass here appear an eternity to us. The soul best the first

JULY III.

THE SILK-WORM.

THE race of caterpillars, which divides into two general classes, (those of nocturnal and diurnal butterflies), have also different families amongst them, each of which has its distinct character and properties. The name of filkworm is given to one of these: this caterpillar, like the others is composed of several moveable rings, and is well furnished with feet and claws to rest and fix itself where it pleases. It has two rows of teeth, which do not move up and down like ours, but from right to left; in order to press, cut, and tear the leaves every way. The whole length of its back, we may see through its skin a vessel which swells every now and then, and performs the functions of the heart. This worm has nine orifices on each fide, which correspond with fo many lungs, and affifts the circulation of the chyle, or nutritive juice. Under the mouth it has a kind of reel, with two holes, through which it puts out two drops of the gum with which its bag is filled. They are like two diftaffs, continually supplying the materials for making its thread. The gum which runs through the two holes, takes that form, and lengthens into a double thread, which lofes fuddenly its fluidity, and acquires the confishence necessary to support or contain the worm. When it is time to be inclosed in it, it joins the two threads together, glueing them one over another, with its forefeet. This double thread is not only very fine, but also very strong, and of an astonishing length. Each filk-worm's bag has a filk thread near as long as 500 ells; and this thread is double, and all along joined together, each bag must contain 1000 ells of filk, though the whole together does not weigh above two grains and a

half. The life of this infect, while it is still a worm, is very short; and yet it passes through different states, which infensibly bring it to perfection. At the first coming out of the egg, it is extremely small, perfectly black, and its head is still a finer black than the rest of its body. Some days after, it begins to grow whitish, or of a dark grey colour. Its coat then becomes ragged and dirty. It throws it off, and appears in a new drefs. It becomes large, and much whiter, but rather tinged with green, as it feeds on green leaves. After a few days, more or less, according to the degree of heat, and quality of its food and constitution, it ceases to eat. It goes to fleep for about two days; then works and frets itfelf extremely. It becomes almost red with the efforts it makes. Its skin wrinkles and shrivels up. It throws it off a fecond time, and with it casts away its feet. Behold it new dressed three times in the space of three weeks or a month. It begins again to eat, and might then pass for a different creature, so unlike in head, colour, and form to what it was before. After having again eat for fome days, it falls again into a lethargy, in recovering from which it changes once more its coat. That is the third skin it has thrown off fince it came out of the shell. It still continues to eat some time, then, renouncing all food, it prepares itself a retreat, and draws out of its body a filk thread, which it wraps round itself, much as we wind thread round an oval piece of woodThis consists of extreme fine silken threads. It rests quictly in the bag it has spun for itself, until the end of a fortnight, when it would break through and make its way out, if it were not prevented, by putting it into an oven or hot sun in order to kill it. These silk bags are thrown into hot water, and stirred about with birchtwigs, to loosen the ends of the silk, which are afterwards wound on reels made for the purpose.

Thus it is to a worm or a caterpillar that we owe the luxury of our cloathing. By means of that liquor from whence it draws its web, it furnishes us with velvet and silk cloaths. This reflection ought to humble us. Can we be vain of the silk with which we are covered, when we consider to what we owe it, and how little we ourselves contribute towards it? Let us reslect, that even the most despicable things have been created for the advantage and use of mankind. A worm, which we scarce deign to look at, becomes a blessing to whole provinces, a considerable object of trade, and a source of riches.

JULY IV. THE RAINBOW.

WHEN the sun reflects its rays on drops of water which fall from the clouds, and we are placed with our backs to the sun, and with the clouds opposite to us, we observe a rainbow.

We may confider the drops of rain as little tranfparent balls, on which the rays fall, and are twice broken and once reflected. From thence proceeds the colours in the rainbow. They are feven in number, and in the following order: red, orange, yellow, green, blue, purple, and violet. These colours appear so much the more lively, according as the cloud behind is darker, and the drops of rain fall the closer. The drops falling continually, produce a new rainbow every moment, and as each spectator has his particular fituation from whence he observes this phenomenon, it fo happens, that two men cannot, properly speaking, see the same rainbow. This meteor can only last while the rain continues to fall. To confider a rainbow merely as a phenomenon of nature, it is one of the finest fights imaginable. It is a picture the most beautifully coloured of any the Creator has given.us. But when we reflect, that God has made this meteor a fign of his pardon, and of the covenant he vouchfafed to make with mankind, we find subject for more than one edifying reflection. There cannot be a rainbow when it rains over the whole horizon. Every time, then, that this beautiful meteor appears, we may be certain, that we have no deluge to apprehend, as in a deluge it must rain violently from every part of the sky. Thus, when the fky is only covered with clouds on one fide, and that the fun appears on the other, it is a fign that these dark clouds will disperse, and that the sky will soon become serene. This is also the reason why we cannot see a rainbow unless the sun is behind us, and the rain opposite to us. The sun and rain must appear at the same time, in order to form a rainbow. No colours would be seen if the sky were too light; therefore, where it appears, the horizon must be covered with dark clouds. Neither could the colours in the rainbow exist without the refraction of the says of the sun upon it.

JULY V.

THE BIRDS NESTS.

THE construction of the birds nest discovers many curious objects which cannot be indifferent to a reslecting mind desirous of information. Who is there that would not admire those regular little edifices composed of so many different materials, collected and put in order with so much care and judgment, constructed with such industry, elegance, and neatness, without any other tool than a bill and two claws. It is not so wonderful, that men can erect great build-

ings according to the rules of art, when we confider, that the artists are endowed with reafon, and have abundance of tools and materials for it. But that a bird, unprovided with any thing for the purpose, except its bill and claws, should be capable of uniting fo much regularity, folidity, and judgment in the construction of its nests, is what we can never too much admire. and well deferves to be examined attentively. Nothing is more wonderful than the nest of the goldfinch. The infide of it is lined with cotton, wool, and fine filky threads. The outfide is woven with thick moss, the colour of which resembles the bark of the tree on which the nest is laid, in order that it should be less observed. and less exposed to the eyes of passengers. There are some nests in which the hair, the down, and the straws are curiously laid across and interwoven. There are others wherein all the parts are neatly joined and tied together with a thread. which the bird makes for itself of flax, tow, and horfe-hair, and more generally of spiders webs. There are some birds (for example the blackbird and lapwing) which, when they have built their nest, plaster over the inside of it with a thin coat of mortar, which cements and keeps together all the bottom parts; and then, while it is fresh, they flick some moss to it, in order to make it warm and close. The fwallow's nest is of a different construction from the rest. They nei-

ther require flicks, straws, nor ligaments. They know how to compose a fort of cement, with which they make themselves nests, perfectly fecure, neat, and convenient. Their method of moistening this cement is by going frequently to dip their breafts into the water, and then shaking it off upon it, till it is thoroughly steeped, after which they work it up together with their bills. But the most extraordinary of all the nests are those which certain Indian birds suspend with great art upon the branches of trees, in order to secure themselves from the pursuits of feveral animals and infects. In general, each fpecies of birds has its particular manner of placing its neft. Some build them on houses, others on trees; fome under the grafs, others in the ground; but all in the manner best adapted for their fecurity, the bringing up of their young, and the preservation of their species.

Such is the wonderful instinct of birds in the construction and situation of their nests, from whence one may naturally conclude with certainty, that they cannot be mere machines. How much industry and intelligence, skill and sagacity, activity and patience do they shew in the building of their nests! Is it not clear that, in all their work, they propose to themselves certain designs? They make the nest hollow, almost like the half of a globe, in order that the heat may the better concentre there. The out-

fide of the nest is covered with materials more or less coarse, not only to serve as a foundation, but to keep out the wind and the infects. infide is lined with more delicate materials, fuch as wool and down, to make it foft and warm for their young ones to lie on. Is it not a kind of reason which teaches the bird to place its nest fo as to be sheltered from rain, and to be out of the reach of destructive animals? Where do they learn they are to have eggs, and that thefe eggs would require nests to prevent them from falling, and to keep them warm? that the heat would not concentre round the eggs, if the neft were larger, nor hold all the young ones, if it were smaller? How do they know the proper fize of the neft, and the number of young that are to be born? Who teaches them not to miftake the time, and to calculate fo exactly, that they never lay their eggs before the nest is finished? Nothing that has been hitherto faid in anfwer to these questions is satisfactory, nor can this mystery in nature be explained. It requires a more perfect knowledge of the fouls of animals than we have. But of what nature foever these faculties of the birds may be, they are certainly the effects of a superior power and wildom, will and a partition of the transport of which water the values, levices us to fleet,

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THE MANY ENJOYMENTS WE FIND IN NATURE.

Linguistical Control of State and the con-ON whatever part of the creation we turn our eyes, we every where find fomething, which interests either our senses, our imagination, or our reason. All nature is so formed, as to afford us numberless pleasing objects, and to supply us with variety of enjoyments continually fucceeding each other. Our love of variety is constantly excited and constantly gratified. There is no part of the day that does not afford us both fenfual and mental pleasures. While the fun illuminates the horizon, the plants, the animals, with a thousand agreeable objects, strike our eyes: and when the night spreads its veil, the majesty of the sky transports and charms us. On every fide nature labours to furprise us with new pleasures. Even the smallest worm, a leaf, a grain of fand, prefents us with objects for ad-We must, indeed, be blind and miration. fenfeless, were we not struck with this infinite variety; and were we not to acknowledge in it the goodness of the Creator. The same spring which waters the vallies, invites us to fleep, pleases the ear, and serves also to quench our thirst. The shady forest, which defends us from the intense heat of the sun, where we

enjoy a delightful coolness, and where we hear the melody of various birds, feeds at the fame time a multitude of animals, which are themselves food for us. Those trees, the blossoms of which are fo pleasing to the fight, will, some months hence, supply us with delicious fruit; and those meadows, now covered with waving corn, will foon furnish us with a plentiful harvest. Nature presents no objects to us, that are not pleasing and useful in more than one respect. The merciful care of Providence ordained that the colour of green, the most mild and pleasing to the eye, should cloath and cover the earth. It was in itself agreeable to the fight, but variety might add charms to it. For this reason we fee light and shade so happily distributed, those different degrees of colour, and those various shades of green. How many different forts of greens there are, which go from light to dark, by a thousand degrees! Each fort of plant has its regular and peculiar colour. Landscapes covered with woods, bushes, greens, herbs, and corn, afford a magnificent scene of verdure, in which the tints of this colour are infinitely varied, mixed, cut, or blended infenfibly, and yet are always in perfect harmony. Each month affords us different plants and flowers. Those that have served their purpose are replaced by others; and thus fuccessively prevent any void in the vegetable kingdom.-But to whom do we owe these numerous and varied gifts of na-

ture? Who is it that provides for our wants and pleafures with fach goodness and munificence? Go and ask it of all nature: the hills and the valleys will tell thee; the earth points it to our fight; the fky is a mirror in which we may behold it; the storms and tempests proclaim it; the voice of thunder, the rainbow, the rain, and the fnow, declare the wisdom and goodness of God. The green fields, the meadows covered with gilded corn, the mountains crowned with forests, raising their heads to the very clouds, the trees laden with fruit, the gardens enamelled with flowers, the rose in its full beauty, all bear the impression of his handy-work. The birds celebrate him with their melodious notes. The bounding flocks, the flag in the midft of the forest, the worm in the earth, the enormous whale, which dashes the waves afar off, and overwhelms great ships, the dreadful crocodile, and that moving mountain the stately elephant; all the numerous host of animals which people the air, the earth, and the fea, they all declare the glory of the Almighty, and proclaim his existence. How unpardonable should we be, were we deaf to this general voice of nature! Oh! let us, that are happy witnesses of these wonders, let us, in the presence of all his creatures, pay him that homage of gratitude and adoration fo justly due to him. Those rich lands, where our flocks graze, those forests which afford us shade and fuel, that sky which is over

us, and gives us light, every thing invites to grateful joy. Let our fouls be filled with it. Let the fense of our happiness, and of God's bleffings, attend us in our walks, and follow us into solitude. We shall find that there is no satisfaction more heartfelt, or more lasting or more conformable to human nature, than the calm pleasures which the contemplation of the works of God afford.

JULY VII.

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REFLECTION ON A FLOWER-GARDEN.

SEE and behold the flower-garden, and reflect on the number of different beauties affembled together in this little space. The art and industry of man have made it a beautiful scene of the finest flowers. But what would it have been without care and culture? A wild desert, full of thistles and thorns.—Such would youth, be, if they were neglected to be formed or properly educated. But when young people early receive useful instructions, and are under wise direction, they are like lovely blossoms, which delight with their beauty, and will soon produce fruit beneficial to society. Behold the night violet, or the Julian flower, which, towards even-

ing Icents our gardens with its perfume, in which it is superior to all others. But it has no beauty. It is scarcely like a flower. It is little and of a grey colour, tinged with green, fo that it can scarce be distinguished from the leaves. Modest, without shew or pretensions, it perfumes the whole garden; although it is not observed in the multitude; and it is difficult to believe that a flower, fo infignificant in appearance, can fhed fo fweet and pleafing a perfume. It is like a person who has much wit, and whom nature has compensated for the want of beauty by more folid endowments. The righteous man often does good in fecret and in obscurity, and flieds around him the perfume of good works; and, when we wish to be acquainted with this beneficent man, we find that there is nothing of distinction either in his person, condition, or rank. In the carnation, beauty and perfume are both united, and it is certainly the most perfect of all flowers. It almost equals the tulip in its colours, and it surpasses it in the multitude of its leaves and the elegance of its form. A little bed of carnations perfumes a whole garden. This flower is the emblem of a person who possesses both wisdom and beauty, and knows how to conciliate the love and respect of his fellow-creatures.-Let us now observe the rose, its colour, form, perfume, every thing in this flower charms us. But it appears to be the flightest and most frail of any, and foon lofes the beauty which distinguishes it from other slowers. This is an useful lesson for those who shine only in beauty, and it ought to teach them not to be vain of their charms.

In general, it is a melancholy fight to fee, in this fine feafon, the ground already strewed with fo many faded and dead flowers. We ought not, however, to complain that Providence does not give more stability to them. The world is a great stage, where we are not to see always the fame actors. It is right that those who have finished their parts should retire, and make room for others. This is what the variety of God's works require; a variety which constitutes part of their perfection. We are also sensible to the charms of novelty; it is therefore necessary that the first objects should disappear. If flowers preserved their blossoms the whole year, they would not please us as much as they do by only lasting a few months. Their absence makes us wish their return. If they were continually before us we should soon be satiated. When we have feen an object in all its different points of view, we have in some measure exhausted its beauty, we become indifferent to it, and we aspire after new pleasures. The variation and continual fuccession of earthly blessings is therefore a means which Providence makes use of to render our lives confiantly agreeable.

Such is worldly happiness. All is vanity. "All flesh is as grass, and all the glory of man

"as the flower of grass. The grass withereth and the flower thereof falleth away." The lilies and roses in a beautiful face fade as well as the flowers of the garden, and death leaves no traces of them. Let us then be wise enough to seek our peace and happiness in constant and durable bleffings. Wisdom and virtue never fade. They are inexhaustible sources of endless joy.

JULY VIII.

Description of the common Phenomena of a Storm.

HOWEVER formidable the phenomena of thunder storms may be, there is something so great and curious in them, that their different effects are well worth inquiring into. It is the more fo, as excessive fright often prevents us from considering, with sufficient attention, this noble fight. When a fformy cloud, which is nothing but a heap of exhalations strongly electrified, approaches near enough to a tower, or a house, or to a cloud not electrified; when it approaches so near, that a spark slies from it, this occasions the explosion which we call a clap of thunder. The light we then see is the lightning, or the thunder-bolt. Sometimes we fee only a fudden and momentary flash; at other times, it is a train of fire, taking different forms and directions. The explosion at-

tending the lightning shews that it is the vapours which occasion the thunder; by taking fire fuddenly, they agitate and dilate the air violently. At every electrical spark a clap is heard. The thunder is fometimes composed of feveral claps, or prolonged and multiplied by echoes. There is generally fome space of time between the lightning and the clap of thunder, by which we may, in some measure, judge of the greatness or nearness of the danger: for it requires a confiderable time for the found to reach the ear, whereas the lightning goes through the fame space, and reaches our fight, much more swiftly. Therefore, as soon as we see a flash of lightning, we have only to reckon the feconds in a watch, or how often our pulse beats, between the flash and the clap. Whoever can reckon ten pulsations, between the lightning and the thunder, is still at the distance of a quarter of a league from the storm: for, it is calculated that the found takes near the time of forty pulfations in going a league. The lightning does not always go in a direct line from top to bottom; it often winds about, and goes zigzag, and fometimes it does not lighten till very near the ground. The combustible matter, which reaches the ground, or takes fire near it, never fails to strike. But sometimes it is not strong enough to approach us, and, like an ill charged cannon it disperses in the atmosphere, and

does no harm. When, on the contrary, the fiery exhalations reach the ground, they fometimes make terrible havock. But, as uncultivated and defart places, where there are neither men nor habitations, fill the largest part of our globe, lightning may fall millions of times without doing any real mischief. The course of the lightning is very fingular, and it is always uncertain. It depends on the direction of the wind, the quantity of exhalations, &c. lightning goes wherever it can meet with combuftle matter; as, when a train of gunpowder is lighted, the flame runs all along the train, and fets every thing it meets on fire. We may judge of the prodigious force of the lightning, by the wonderful effects it produces. The heat of the flame is fuch, that it burns and confumes every thing that is combustible. It even melts metals; but it often spares what is contained in them. when they are of a substance not too close, to leave the passage free. It is by the velocity of the lightning, that the bones of men and animals are fometimes calcined, while the flesh remains unburt; that the strongest buildings are thrown down, trees split, or torn up by the root, the thickest walls pierced, stones and rocks broken and reduced to ashes. It is to the rarification, and violent motion of the air, produced by the heat and velocity of the lightning, that we must attribute the death of men and

animals found fuffocated, without any appearance of having been struck by lightning.

Let us reflect seriously on these strange and dreadful phenomena. How many wonders there are united in a ftorm! The wind rifes; the storm begins; but God himself is in the whirlwind, and " walked upon the wings of the " wind." At his command the clouds disperse and the thunder, lightning, and hail are feen to fly. " Listen attentively to this voice, and " the found that goeth out of his mouth." But, if his dreadful lightnings terrify the universe, his beneficent hand abundantly provides for all his creatures.

Creating of the second of the JULY IX. THE ANTS.

I HE ants, as well as the bees, may be confidered as a little commonwealth, which has its peculiar government, laws, and police. They live in a fort of town, divided into feveral freets. which lead to different magazines. Their activity and industry, in collecting and using the materials they require for their nest, is admirable. They all join in digging the earth together, and carrying it afterwards home. They collect a great quantity of grafs, straw, wood,

&c. of which they make a heap. It appears, at first fight, very irregularly formed; but through all this apparent diforder, much art may be discovered when examined more attentively. Under the domes, or little hills which cover them, and which are always fo formed, as to let the water run off, there are galleries which communicate with one another, and may be confidered as the streets of this little city. But what is particularly admirable, is the care which the ants take of their eggs, of the worms when they come out of the chryfalis when formed. They convey them carefully from one place to They feed their young, and remove, with the tenderest folicitude, every thing that might hurt them. They even attend to preferving a proper degree of warmth about them. Their painful labours in fummer time, when heaping up provisions, have scarce any object but the support of their young, as they themselves require no food in winter, being afleep, or infenfible till spring. As soon as their young are out of the egg, they employ themselves in feeding them. They generally have feveral houses, and they convey their young from one habitation to some other which they wish to people. According as the weather is hot or cold, dry or rainy, they bring their chryfalis near the furface of the earth, or remove them from it. They bring them to the furface in mild weather, and even formetimes after rain lay them in a bright fun, or after a long drought, in a gentle dew. But at the approach of night, rain, or cold, they take up their little ones in their paws; and carry them so low down into the earth, that it is fometimes necessary to dig above a foot deep in order to find them. There are several forts of these insects: the wood ants never live but in forests or bushes, and do no harm to fields. There are two species of these, the red and the black. Some fettle in the ground in dry foils, and generally chuse places where they find roots of fir-trees or birch, to make their habitations. Others live in old trunks of trees above ground, high enough to be out of the reach of its moifture. They make themselves apartments in the cavities of the trunk, and cover them with straw and other things to shelter them from snow or rain. The field ants are also both black and red as well as the others, but they are smaller. They fettle either in the corn or the field. When the weather is dry, they bury themselves pretty deep; but as foon as it becomes rainy, they raife their habitations higher and higher, according as there is more or less damp; and when it abates, they never fail of returning to their subterraneous apartments. It is also to be observed, that the ants acquire wings; and that towards autumn they are feen to fly in swarms over ditches and other water. But are these mischievous infects worthy our attention, spoiling as they do, our fields and meadows? By their

fubterraneous works, they make the ground hollow; tear it up, and prevent the plants and roots from growing. They are enemies to the bees and filk-worms; and they are supposed to hurt the flowers, and particularly the young trees. It is faid, that they devour the buds and shoots; and that getting under the bark of trees, they knaw them to the quick. For this reason, the ants are destroyed wherever they are found. If the ants gathered honey, though at the expence of a million of other creatures, they would be highly valued; but because their labours hurt fome useful plants, we think ourselves authorised to destroy them. Suppose even, that in reality, they do us some harm, are they therefore less worthy our attention? Do none deserve our observation, but such as are useful to us? Let us banish this prejudice. Even the ants may afford us instruction and amusement. The form of their limbs, their industry, their indefatigable labour, their order, their tender care of their young, and perhaps a thousand other qualities, which we are not acquainted with, might convince us of the wisdom of that great Being, who is their Creator as well as ours. For, of all the works of God, there is not one which has not its use, and is not worthy our admiration, however useless, or even hurtful, it may appear at first fight. The supreme Creator, by whom all things exist, has created nothing without design. The trees have not a leaf, our meadows have not a blade of grass, nor our flowers a fibre, that is useless.

JULY X.

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THE HAIL.

HAIL is nothing but drops of rain, which freezing in the air, fall in peices of a spherical oblong, or angular form. If it appears extraordinary that in the very warmest seasons of the year, vapours should freeze in the atmosphere; we may consider, that, even in the greatest heats, the upper region of the air is cold to a fenfible degree, and full of fnow. If it was not fo, how could the highest mountains remain the whole fummer covered with fnow. In the hottest parts of America it is so severely cold on the highest mountains, that there is continual danger of being frozen; and, of courfe, it would fnow from this extreme cold in the upper region of the atmosphere in the very middle of fummer, if the snow did not melt in falling before it reaches the ground. But when these particles of fnow collect together, the drops begin to freeze; and, as in falling they go rapidly through warmer regions of the air, it happens, that before this warmth can have pene-

trated through them, their cold increases, so as to be entirely frozen. It might be imagined, that the cold, on the contrary, ought to abate in proportion as they pass through a warmer air. But what is the consequence in winter, when cold water, which has been exposed to the outward air, is brought into a very hot room! It freezes and becomes ice, which would not have happened if it had been put into a cold room. This is precifely the case in respect to the hail. When cold bodies pass suddenly into hot air, their cold increases to such a degree, as to turn to ice. The volatile falts, more or less dispersed through our atmosphere, contribute much to this. We must not therefore be furprifed that storms are not always attended with hail, as it requires great abundance of faline vapours to occasion the sudden freezing of the drops of water. Though hail is more frequent in fummer time, it falls also in other seasons: for, as in every part of the year the faline exhalations may ferment in the atmosphere, so it may hail in winter, autumn, or fpring. The form and fize of the hail is not always the fame. The hailstones are fometimes round, at other times concave and hemispherical; often conic and angular. Their usual fize is that of small that or little bullets; feldom as large as nuts. It is afferted, however, that there have fallen some as large as the eggs of a goose. The difference we observe in the form and fize of hailstones may proceed from many accidental causes. The winds, (particularly violent winds that cross one another,) certainly contribute much towards it. A hailstone may also in its fall meet several other cold particles, which confiderably increase its fize; and often the small hailstones meet others, and in joining together form into large ones. It is certain that, when the hail is very large, it does inexpressible mischief to the vintage and harvest, fruit, &c. But this does not authorife us to consider it as a curse from heaven, a judgment, or a punishment from God. If the violence of this meteor fometimes lays waste acres of land, and breaks millions of windows, this mischief, however great it may be, is nothing in comparison of the advantages which accrue to us from it. The hail evidently cools the air in the burning heats of fummer. nitre and falt in the water which falls, contribute much to make the earth fruitful. And it is very remarkable, that though all the meteors appear to fucceed one another without any regularity, and are all different one year from another, yet this apparent disorder never fails to produce fertility.

Here then, again, God shews his goodness and wisdom; for his beneficent hand worketh admirable things, and never ceases to enrich

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and fertilize the earth.

JULY XI.

USE OF STORMS.

DUTY, which ought to appear to us the more indispensable, because it is neglected by many thoughtless, ignorant, and ungrateful people, is that of considering all the phenomena of nature in the light which may most fensibly impress upon our minds and hearts the wisdom and goodness of our heavenly Father. It is true that it must be allowed, he sometimes makes use of natural phenomena to punish the fins of mankind; but these particular cases do not prove, that God does not chiefly and in general propose to himself the good of the whole. All nature affords undeniable proofs of it. We will now dwell on one fingle phenomenon, particularly adapted to convince us of it, and on which we require that our common opinions of it should be rectified. Are we not, many of us, from our infancy, accustomed not to pronounce the words thunder and lightning, without trembling? We are so unjust, that we only think of those very rare cases, when storms are fatal to a very small part of the universe, while we are totally insensible to the great advantages which result from them, taken in the whole, Alas! we should soon change our language, if God, provoked at our ingratitude and complaints,

was to deprive us of the bleffings which we derive from thunder-storms. Let us represent to ourselves an atmosphere loaded with noxious and pestilential vapours, which thicken more and more by the continual exhalations of earthly bodies, fo many of which are corrupt and We must breathe this air: the prepoisonous. fervation or destruction of our existence depends upon it. The falubrity or unwholesomeness of the air gives us life or death. We feel how we are oppressed in the stifling heat of summer; with what difficulty we breathe; what uneafiness we experience. Is it not then a great blessing, when a falutary from comes to purify the air from all noxious vapours; and, by lighting up the faline and fulphureous particles, prevents their dangerous effects, cools the air, restores its elasticity, and with it our usual facility of breath-Were it not for storms, the dangerous exhalations would more and more increase, and Men and animals be more and more corrupt. would perish by millions. Which is it then most reasonable, to fear or to wish for storms? To murmur at the flight mischief it may sometimes occasion, or to bless God for the great advantages it procures us? Let us add, that not only men and animals are benefited by purifying the air, but that it is also very useful to the vegetables. Experience teaches us, that the rain, which falls when it thunders, is the most fruitful to the earth. The faline and fulphureous

particles, which fill the atmosphere during a storm, are drawn down by the rain, and become excellent nourishment for plants; without mentioning the number of little worms, seeds, and little insects, which are also drawn down in thunder showers, and are, with the help of a microscope, visible in the drops of water.

Such reflections as these may moderate the excessive sear we have of thunder, which shews how little considence we have in God. Instead of filling our minds with frightful and terrible ideas, let us accustom ourselves to consider a storm as a sublime and great object. Instead of speaking of the missortunes occasioned by thunder, let us reslect rather on the necessity and great use of storms. Instead of praying to God that there may be none, let us pray that he may vouchfase to send them; or rather, let us trust entirely to that great Being, who always governs the world with wisdom and goodness.

JULY XII.

THE EARTH AND ITS ORIGINAL CONSTI-

GOD has made the earth of a proper nature for the production and growth of herbs, plants, and trees. It is compact enough to contain and

hold the vegetables; fo firm, that the wind does not throw them down; and yet it is light and moveable enough for the plants to extend their roots, and draw out the moisture and nutritive juices. Even when the furface of the earth is barren and dry, this lightness gives power to the juices to rife up as in the capillary vessels, to furnish the trees with the nourishment they require. Besides this, the earth is full of oleaginous particles, and many other juices which are good for the growth of plants. And to the end that all forts of vegetables should grow and draw subsistence from the earth, God has formed feveral forts of foils, which ferve for other purposes also: such as potter's earth, clay, chalk, and gravel. Some ferve to make bricks, others to build with, and fome to make earthen ware. There are also kinds of earth which are made use of in dyeing colours; and even in medicine. The unevennels of the ground has many advantages: a greater number and greater variety of animals and plants may live on mountains; they serve to break the violence of the winds; they produce a great variety of wholesome plants and fruit, which would not do well in plains. They contain in their cavities the minerals and metals fo useful to us: from them proceed the fprings, and most of the rivers, produced by the melting of the snow, by rain and other vapours. The stones that are under ground, ferve to build walls, to make lime and glass. As

to the metals, their uses are numberless: let us only think of the many tools our workmen and artists require; the utenfils and furniture of every fort made of them, which furnish us with fo many conveniencies and ornaments. We also draw considerable advantages from the hardness and weight of those bodies. Nobody is ignorant of the use of minerals. Salt serves to feason our food, and to keep it from corrupting. The fulphureous particles of bodies render them combustible. Even volcanos and earthquakes, whatever mischief they sometimes do, are still ufeful and necessary. If the fire did not confume the fulphureous exhalations, they would fpread too much in the air, and would make it unwholesome. Many warm baths would not exist; and many minerals and metals would never be produced. It is to our ignorance we should impute it, if there are so many things of which we do not see the use. At the fight of certain phenomena in nature fometimes hurtful to us, we ought always to remember this maxim: If God now and then permits certain imperfections to take place, it is that they may contribute to the greater perfection of the whole. In order to judge of his works, and to acknowledge the wisdom of them, they must not be confidered in one point of view only, but taken in the whole. Many things we suppose hurtful, are, notwithstanding, certainly of use. Others appear superfluous; and yet, if they were wanting, they would leave a void in the plan of the creation. How many things appear to us infignificant, only because we do not know the real use of them? Put a loadstone into the hands of a man who does not know its virtue, and he will scarce deign to look at it; but tell him, that we owe to that stone the progress of navigation, and the discovery of a new world, and he will then be of a very different opinion. It is the same with respect to a million of things which we despise, or judge ill of, because we do not know their use, nor see the connection they have with the whole.

JULY XIII.

ON THE PHASES OF THE MOON.

ALL observation confirms to us, that the moon has a particular motion of turning round the earth from west to east; for, after having placed itself between us and the sun, it retires from under that body, and continues to go back towards the east, changing from day to day the place of rising. At the end of fifteen days it will have reached the most eastern part of the horizon, at the time the sun sets with us. It is then in opposition. In the evening it rises above

our horizon when the fun retires below it, and it fets in the morning about the time the fun rifes. If, then, it continues to describe the circle which it has half finished round the earth, it removes visibly from its point opposite to the sun; it will draw nearer to the fun, and will appear later than when in opposition, till by degrees it will only be seen a little before fun-rife. This revolution of the moon round the earth explains why it rifes and fets at fuch different times, and why its phases are so various, and yet so regular. Every body knows that a globe, illuminated by the fun or by a flambeau, can only receive the light directly on one fide. We perceive, at first fight, that the moon is a globe which receives its light from the sun. When, therefore, it is in conjunction, that is to fay, placed between the fun and us, it turns all its illumined fide towards the fun, and its dark fide towards us, and is then, of course, invisible. It rifes and fets with the fun in the same region of the sky. This is what we call new moon, or the conjunction. But when the moon retires from under the fun, and goes back towards the east, it has then no longer all its dark fide turned towards us: a fmall part-of it, a little border of the lighted half begins to appear. This illumined border we see on the right fide towards fun-fet, or even before it. The horns of this crescent turn to the left, or facing the east. The farther the moon removes from the fun, the more visible it becomes to us. At the end of feven days, when it has reached a quarter of its course round the earth, it discovers more and more of its illumined fide, till it shews us half of it. The light part is then turned towards the fun, and the dark part casts no light on us. Exactly half the moon is then illumined. The half of that half can only be the quarter of the whole globe, and it is in reality this quarter which appears to us. The moon is then in its first quarter. By degrees, as the moon removes from the fun, and as the earth comes between them, the more of that part of the moon, which faces us, becomes light. At the end of feven days, reckoning from the first quarter, it is almost directly opposite to the fun, and then its whole illumined disk presents itself to us. It then rises in the east exactly at the moment the fun fets in the west, and we have a full moon. Next day the lighted half is already a little turned from us, and we no longer fee it at all. The light gradually leaves the western side, extending itself in proportion on the half not facing the earth. This is the decrease of the moon, and the more it goes forward, the more the dark fide increases, till at last half the dark side is turned towards the earth, and consequently half the light side. It has then the form of half a circle, and is what we call the last quarter.

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Let us adore the wisdom and goodness of our Creator, so manifest in the different phases of the moon. By the admirable harmony which subsists between the motion of this planet on its own axis, and its course round the sun, it so happens, that the moon still shews us the same half a globe which it has shewn from the beginning of the world. During so many millions of years this globe has constantly, and without deviating from the same course, finished its revolution in 27 days and eight hours. Regularly, and at the same periods, it has lighted sometimes our nights, and sometimes those of remote countries.

The continual changes of the moon, both in respect to its phases and its course, are lively images of the revolutions to which all earthly things are liable. Sometimes health, spirits, plenty, and a thousand other blessings, concur to make us happy, and we walk as in a blaze of light. But at the end of a few days all this splendor vanishes, and there remains only the fad remembrance of having enjoyed those frail blessings. How ardently, therefore, ought we to wish to go from this uncertain world to those happy regions, where every blessing will appear to us so much the more valuable, as they will never be subject to change.

JULY XIV.

MINERAL WATERS.

W HETHER we consider mineral waters in respect to their formation, or the benefit that accrues to us from them, they are certainly valuable bleffings. But in this it happens, as in many other cases, that we are too often heedless and ungrateful. Even the places where thefe falutary springs flow in abundance are seldom what they ought to be, places confecrated to praise and gratitude towards heaven. Let the following reflections make us more grateful: in the first place, are not the springs from whence we draw the common falt to feafon our food. worthy our attention? It is probable, that thefe fprings originate from the mineral falt, which the waters dissolve under ground. The mineral hot baths are not less remarkable: there is not only fo great a number of them, that in Germany alone they reckon about fix-score, but they are also so hot, that it is necessary to let the water cool for twelve, and fometimes eighteen hours before they are fit to bathe in. What is the cause of this extraordinary heat? It certainly is not the fun; for if it were, the waters would only preferve their heat in the day time when the fun shines, and they would grow cold

in the night or in winter. Neither can it be attributed to suberraneous fires; for it would hill be necessary to account for the medicinal virtue of these baths. The most simple cause we can give is this, that the waters, passing through ground mixed with fulphur, fire-stones, and metals, acquire this degree of heat. When the water falls on these quarries, the sulphureous and ferruginous particles which it diffolves, heat and take fire by the friction and reaction of their principles; and communicate this heat to the water. Medicinal waters, particularly the acids, are produced by the diffolving and mixing with the minerals they wash away. They are found particularly in places where there is abundance of iron, copper, fulphur, or charcoal. This is the reason there is such difference both in the effect and taste of them, in proportion as they are more or less mixed with these. They are bitter when they are produced by bitterroots, bad rosin, saltpetre, or copper. They are cold when they come out of the rocks, or are impregnated with fal armoniac, faltpetre, alum, &c. -Oily and bituminous substances make them oleaginous; brimstone, mixed with acids, makes them fulphureous.

Let us admire the divine goodness which has prepared for man those salutary and inexhaustible springs. Mineral waters may certainly answer many other purposes; but it cannot be doubted they were also produced for the preserving

vation and health of mankind. Let us then acknowledge God's goodness, and be sensibly touched with it. Those particularly who experience their strengthening and salutary virtue. Let them try to imitate his example, by affording consolation to their sellow-creatures in necessity.

JULY XV.

THE CONTINUAL ACTIVITY OF NATURE IN THE VEGETABLE KINGDOM.

W HOEVER wishes to know why nature is never idle through the course of the whole year, has only to reflect on the numberless advantages which refult from this constant activity. Vegetables were defigned for the use of men and animals; both for food and pleasure to the former, as food only to the latter. The beneficent Creator, in order to bestow nourishment on man in the most pleasing manner, ordained that the plants, instead of coming all at once, should fucceed each other. In reality, if they were produced at the same time this purpose could not be fulfilled. How could men find time to get in their crops and harvests, if every thing was ripe at the fame time? How could all of them be preserved, as many are of very short duration,

and foon lofe their tafte and qualities? What would then become of the pleafing fenfations they afford to our fight and tafte? What flayour would cherries and other fummer fruit have, if we were to eat them in winter, covered with fnow and ice? Would not wine turn to vinegar, if the grapes were to ripen in the heats of fummer? What would become of so many millions of animals, whose preservation the beneficent Creator watches over as well as that of mankind? How could they live, if all the produce of the earth came to maturity at the fame time? There are a hundred forts of infects who feed on flowers. How could they fubfift if those lasted only one or two months? Could they gather enough to have always fufficient food? It is true, that most infects find none in winter; but they are formed accordingly, and in the time that their food would fail them, they fall into a found fleep, and do not require any; which would not be the case in summer, as the heat would weaken them. It is then certain, that if nature were planned otherwise, men as well as animals would not only fuffer by it, but even perish with hunger: and we may fafely affert, that their support is one of the chief defigns of providence in the constant activity of the vegetable kingdom. If we next reflect on the pleasures of fight and taste, which God has pleased to grant to man, we shall find that, for this purpose also, it was necessary that nature

should be thus planned. It required not only that the flowers should be displayed in full beauty, but that there should be some all the year for our continual enjoyment. In fpring, when we go to the country, in order to contemplate the many productions which the Creator causes to fpring up for our food, we behold the trees in full bloom. Towards fummer, when farmers are chiefly taken up with the corn, a thousand beautiful flowers charm the fight. They appear fuccessively, and replace each other the whole feafon, as long as man can enjoy this object. At last, when the cold winter arrives, and shuts us up in our houses, nature produces other vegetables, which are not indeed firiking to the fight, but which have a thousand uses. All this proves. that the pleasures and comforts of mankind are purposes proposed by God in the plan of nature. Every thing is fo ordained as to provide sufficient nourishment for men and animals, and also that the former should enjoy as many pleasures and comforts as possible. Consequently, some plants produce their bloffoms and fruit in fpring, others in fummer, others in autumn or winter. Thus each has its allotted time, and appears precifely when most useful. Scarce have some done their service, when others appear in full beauty. We behold millions of plants, and they all follow the fame law.

Every thing created by God, is according to the same wise and regular order, though our limited understandings may sometimes prevent us from discovering the use and purpose of them. Let us, therefore, acknowledge that, in all the revolutions of the vegetable kingdom, God has our welfare in view. With what gratitude ought not this thought to inspire us!

JULY XVI.

THE BEAUTY AND USE OF MEADOWS AND FIELDS.

I HE fight of a large beautiful garden in fummer gives us a lively pleafure, which our apartments do not afford, of which we can form no idea. But even the pleasure we feel from the finest garden is not to be compared to that of walking in fields and meadows. The stately tulip, the elegant narciffus, the beautiful hyacinth, none please so much as the simple flowers which enamel the fertile valley. Whatever charms the flowers may have, which are cultivated in our gardens, those in the fields are still more pleasing. There is beauty in the former, but in the latter there is both use and beauty. Mere useless beauty pleases for a moment only. Is it not true that, in those long gravel walks, fo even and neat, those arbours and summer houses.

those parteres with pretty borders, those walls, those inclosures; is it not true that we feel confined, and as if oppressed in them: all those places, where the view is confined, feem to fet bounds to our liberty. We wish to fly away to the fields and meadows. We feem, in some degree, to be more independent, and more at eafe, in proportion as our walk enlarges and lengthens before us. In the country, in fummer, Nature, fruitful and beautiful, varies every moment its appearance; whereas, in our ofnamental gardens, we continually behold the fame objects. Even their order and regularity prevent us from being pleafed with them... They have nothing new to offer us, and we tire of them. The eye, on the contrary, wanders with pleasure over objects continually diversified, and extending as far as the fight can reach. It was in order to give us this enjoyment, that, in most places, the ground was formed smooth and even; but to the end that we might also have pleasing distant prospects, our horizon is surrounded with rifing hills. Nature has done still more: it has spared us the trouble of cultivating those flowery meads, or of watering them. An innumerable multitude of feeds are fown in them, which produce a verdure scarce ever interrupted, or which is at least easily renewed. This prodigious variety of plants with which a field is covered, is not for the fight only: they

have each a feed, a bloffom, qualities, and beauties, peculiar to themselves. It is true, that the same species of herbs is prodigiously multiplied in each field; but perhaps we do not make two fleps, without treading on an hundred different forts, each of which has its peculiar use. This is one of the first reflections we ought to make at the fight of a field. To the pleasure it affords us, our beneficent Creator added confiderable advantages. They produce plants for our food, and a wonderful number of simples, which serve for medicine. But the greatest use the fields are of to us, is the feeding, without expence, those animals we can the least dispense with. The ox, as well those whose flesh we eat, as those whose labour helps to plough our ground, requires no food but The horse, whose services are innumerable, demands no other recompense for his toil, than the free use of the field, or a fufficient quantity of hay. The cow, whose milk is one of the great supports of our life, asks nothing The field is the most complete inherimore. It is even preferable to meadows, as its produce is certain, and requires neither fowing nor labour. It only costs the slight trouble of gathering what it yields. Its productions are not casual, for it seldom happens that fields are destroyed by drought or inundations. But it is melancholy, that men, who are generally so inattentive, so insensible to the bleffings of God,

should be so in this respect also. We look upon grass with contempt or indifference, perhaps, because it grows under our feet, and has not been made the object of our care and culture. But, whatever may be the cause of our indifference, it is certainly quite inexcusable. Would to God, that our hearts were grateful whenever we walk in our fields and vallies! that, at the fight of our meadows enamelled with flowers, we were fenfibly touched with the goodness of the Creator, who, with a bountiful hand, pours out abundance. There is not a corner of the earth, where we may not discover traces of his good providence! Every country, every foil, the good and the bad, all equally proclaim the Preserver of the universe.

JULY XVII.

THE MORNING TWILIGHT.

IT cannot be doubted that this phenomenon which we daily behold is, equally with the rest, designed for our benefit. The twilight is nothing more than a prolongation of day; which prepares our eyes sometimes to bear the full light, and at other times the darkness of the night. But twilights are not always the same; they vary according to seasons and climates.

Toward the poles they last longer than in the torrid zone. The people of that zone behold the fun rife directly above their horizon, and fink down in the fame direction under the lower hemisphere; by which means they are left all at once in total darkness. On the contrary, the fun reflecting its rays obliquely towards the poles, and not finking much below the horizon of the neighbouring people, their nights, though long, are almost all along attended with the twilight; therefore not dark. It is an happiness for the former to have scarce any twilight, and for the others to have an almost constant dawn. As for us, who are placed nearly at an equal diftance from the torrid and the frigid zone, we plainly observe that our twilights become shorter in proportion as the days shorten; and that they increase as the days lengthen. We enjoy daylight an hour and more, after the fun has fet. The twilight is equally long before the fun rifes above the horizon. We owe this useful circumstance to the properties of the air. God has furrounded the earth with an atmosphere, which rifes very high. He formed fuch proportion between this air, and the light which comes upon it, that when it enters directly down into it, nothing can obstruct its course; but when a ray enters fideways, or obliquely into this air, the ray, inflead of passing through the air in a direct line, bends or descends a little lower; so that most of the rays which pierce the atmosphere along the

fide of the earth, fall again by means of this inflection upon the earth. Instead of following their course in passing by the side, they are bent by the air, and directed towards the earth. Thus, when the fun approaches our horizon, many of its rays which pass by us, and are not fent towards us, meet the mass of air which surrounds us, and bending in that mass they reach our eyes; fo that we fee day-light long before the fun itself appears. This refraction of light in the body of air which furrounds us, is a work equally full of wisdom and goodness for all the people of the earth; but is a particular bleffing to those who inhabit the frigid zones. They would be plunged in frightful darkness for several months together if they had not twilight. -Perhaps this explanation of the origin of twilights may not be intelligible to every body, but let us leave to philosophers a further detail of it, and let us limit ourselves to the reslecting on it as reasonable beings. Even a farmer may have understanding enough for this: it only requires an upright heart, willing to glorify his Creator. The honest, though ignorant man, may possibly be wifer than many philosophers; who, while they are explaining and calculating the twilights, lose fight of that great Being who gives to man the light of day.

JULY XVIII.

EVENING TWILIGHT.

I HE evening twilight is that faint light, which after fun-fet, still is visible in our atmofphere, particularly in the west. It is occasioned partly by the refraction and reflection of the rays of the fun in our atmosphere; and partly by the atmosphere of the fun itself, known by the name of zodical light, which fometimes appears, but particularly towards evening in fpring, and in the autumn towards morning. the fky is serene, the smallest stars are visible at twilight; which continues from fun-fet till the dark night, and generally lasts two hours. In the island of Senegal, where the nights are almost always as long as the days, the twilight lasts but a few moments. The interval between funfet and the darkness of night, is scarce more than a quarter of an hour. Thus, as foon as • the fun is ten or fifteen degrees below the horizon, darkness is spread over all the country, and it is like midnight. It is about the first of March, and the eleventh of October that our twilights are the shortest. When the northern declenfion of the fun, and that of the equator under the horizon, are fuch that the fun does not descend eighteen degrees below the horizon, the twilight lasts all night. This is the reason,

that in the summer solftice we have scarce any night in our countries; and that there is none in the more northern parts, though the sun is below the horizon.

The advantage which accrues to us and many other creatures from twilights is very evident. To go all at once from broad day to dark night, would be very inconvenient. So fudden a change from light to darkness, would hurt the organs of fight, and might destroy them. Many travellers would lose their way, surprised with sudden night; and most birds would be in danger of perishing. The wise Author of nature has prevented all these inconveniences, as by means of twilight we pass gently and gradually from day to night.

JULY XIX.

THE EPHEMERAL FLY.

THIS infect is called ephemeral, on account of the short duration of its life in the state of a sty. It is one of the prettiest forts of little slies. It undergoes sive transformation. First, the egg contains the principles of its life. It comes out a caterpillar, which turns into a chrysalis, afterwards into a nympha, and ends in being a sty. This sty lays its eggs on the water, where

the heat of the fun hatches them. Each egg, produces a very small red worm. They are found all fummer, in great abundance, on ponds and marshy places. But, as soon as the water begins to grow cold, the little worm makes itself a bag, where it passes the winter. Towards the end of that season, it ceases to be a worm; it enters into its third state, and is transformed into a chryfalis. It fleeps then till fpring, and becomes by degrees a pretty nympha, or a fort of mummy, fomething in the form of a fish. On the day of its metamorphose, the nympha at first appears lifeless and without motion. At: the end of fix hours, the head shews itself, and rifes by degrees on the furface of the water. The body afterwards difengages itself flowly and gradually, till at last the whole animal comes out of the shell. The new-born fly falls on the water, and remains motionless for some minutes. By degrees it begins to revive, and feebly flirs its wings. Then it moves them quicker, and tries first to walk and then to fly. As these flies are all hatched nearly at the fame moment, they are feen in fwarms jumping and playing on the furface of the water for two hours. The male and female then feek each other for two more hours. Afterwards they begin again to fkip and play; lay their eggs, and foon after fall down and die. Thus they finish their short life, at the end of five or fix hours, and never do they furvive the day that gave them birth.

Let the history of these little animals teach us how false a judgment we form of the duration of our lives, in comparison of eternity. Suppose, that one of these flies had preserved its active and laborious life for twelve hours, and of course had arrived at extreme age, according to their nature, and in comparison with its companions, who had most of them died at noon. If this old infect could speak, perhaps, a little before its death, towards fun-fet, it would address the following discourse to the friends affembled round him: "I now fee that even the longest life must end at last. The term of mine is arrived, and I do not regret it, for old age began to be a burden to me; besides, I no longer faw any thing new under the fun. All that I have feen, during the course of my long life, has taught me, that there is nothing certain or durable here. A whole generation of ephemerals have been destroyed by a violent storm. The coolness of the air has carried off numbers of young people in their bloom. I lived in the first ages of the world. I have conversed with infects much more respectable, robust, and better informed than any of the present generation. I can also affert for truth, that the fun. which now appears fo near the earth, I have feen; it in the middle of the sky. Its light was formerly much more bright than at prefent, and our ancestors were much more sober and virtuous than we are. I have feen many things.

have a long experience; and I have outlived all my cotemporaries. My life began exactly when the fun was rifing. During years without number it has traverfed the fky with majesty, and every where spreads its benign warmth. But now that is on the decline, and going to fet, I foresee that the end of all things draws nigh. O my friends! how I flattered myself formerly that my life would be eternal! How beautiful were the cells I had made to live in! What hopes I founded on my good constitution, my Arength, my activity, and the use of my wings! But, after all, I have lived enough, and few of those I leave behind me will run so long and happy a course as mine." Thus might an insect fpeak, which had lived near twelve hours upon earth. But might not a man, who had lived fourfcore years, hold nearly the fame language. The difference between twelve hours and fourfcore years is nothing when compared with eternity. Do we, in general, make a better use of our fourscore years than the fly does of its twelve hours ?

JULY XX. Nothing perishes in Nature.

If there was any thing in the world which perished without being of use, one might doubt the wisdom of God's government. But we

have reason to suppose that throughout the immenfe circle of the creation there is nothing loft, not even the smallest grain of dust; but that every thing exists for certain purposes, and that each answers in its way the design for which it was created. The feed which falls from a flower is not destroyed. It is often carried away by the wind to make other flowers fruitful, or it takes root in the ground and becomes a tree. Other feeds, or fruit, which fall, are eaten by birds and other creatures. They mix with their juices, and go through the necessary preparation to make manure for the fields, for the use of men and animals. Certain things, it is true, corrupt and diffolve; but then they become parts of fome other fubstance, and ferve, under a new form, the defigns for which they would not have been proper in their former state; because, in order to do so, they required being prepared by different transformations, and by mixing with other fubstances. The butterfly would not have produced a butterfly, if it had not at first been a worm. No animal whatsoever, fuch as we see them, could have existed if the feed had not pre-existed in the first animal of its kind. Nothing then in nature is loft. Things are only separated or dissolved, in order to appear in a new form, and to become parts of some other substance. Each grain of dust may be called the feed of a new creature, and holds its placed in that chain of beings, which

has been produced for the perfection of the whole. If you take a handful of the fand you tread on, you perhaps destroy the lives of. a million of infects, which inhabited those grains of fand. If we were better acquainted with the infide of things, we might determine with more certainty what the other substances were which in a manner concealed them before. and into the composition of which they entered. -But abortions or children who die in the birth, ought they not to be confidered as creatures that perish without having been of use? Certainly not. They fulfil (in their way) the defign of the Creator, and are prepared by many changes for their future state. Nature does nothing at one step. Man was first a child, the tree a shrub. Each creature exercises its powers during its short duration, and prepares itself for a new state. The step that man must take to pass from the mere sensitive life of childhood tothe rational life of a riper age, is certainly not greater than that which the child must take in its mother's womb in learning to feel. And we can no more fay, That fuch a child has not anfwered the purpose for which it was created, than we can fay it of a man, because he may not here below have answered those designs which he is not to fulfil till he becomes an inhabitant of heaven. Each creature fulfils, in its way, and in proportion to its faculties, the end proposed. Like the wheels of a watch, some move

equick, others move flowly; but all tend, in a nearer or more remote manner, to the great end of their existence, and contribute, according to their power, towards the general plan formed by God. We may meet many things in nature which will, at first fight, appear useless, and, confequently, to have been produced without defign. We may imagine, that others have been entirely destroyed or annihilated. But let us not judge rashly, or too readily blame the ways of Providence. Let us rather believe, that all we behold, however strange and unconnected it may appear to us, is planned most wifely; and that God fulfils his defigns, even when we blind and ignorant mortals can form no idea of the end he proposes. Let us look around; all is connected; all is in its proper splace, and nothing is owing to chance. There is not a thing in the world useless, even when turned to dust. Nothing in nature is lost. Nothing perishes; not even the smallest leaf; not a grain of fand; not one of those insects invifible to the human eye; not one of the feeds blown away by a zephyr. That stupendous firmament where the fun thines with fuch dazzling lustre; that swarm of insects which play in the fun-beams, and which we breathe without knowing it, all appeared at the word of the Creator. All exists never to end. All is perfect throughout the universe.

JULY XXI.

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DIFFERENCE OF ZONES.

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1 HE Creator having made our earth in the form of a globe, and having impressed upon it a double motion, it necessarily followed, that the regions of the earth must be different from each other; not only in respect to the temperature of the air, and the feafons, but to the animals and plants also. In certain countries there is but one feason; the summer is continual there. and every day is as hot as our hottest summer days. Those countries are situated in the middle of the globe, and occupy the space called the Torrid Zone. The finest and richest fruits which nature produces grow there; and it is there in general where the most liberally pours forth her treasures. The days and nights are of equal length most of the year. There are, on the contrary, countries, where, during the greatest part of the year, it is so extremely cold, as to be beyond our feverest winters. It is but a few weeks in the year warm enough for the few trees and herbs which are there, to grow or become green; and in those frigid zones, neither the trees nor the earth produce fruit which mankind could feed on. The greatest inequality of day and night is there: each of them last in their turn for whole months together.

The two temperate zones placed between the torrid and the frozen, occupy the greatest part of our globe. In those countries, four feasons appear more or less distinctly, according as they approach the torrid, or the frigid zones. The foring, wherein the trees and plants bud and bloffom, the heat is moderate, and the days and nights nearly equal. The fummer, during which the fruit of the field and trees ripen, when the heat is more intense, and the days become visibly longer than the nights. The autumn, when the fruit and the feeds fall off, and the grafs withers, while the night again becomes equal with the day, and the heat is daily abating. The winter, during which the vegetation of plants totally or partly ceases, the nights lengthen, and the cold more or less increases. The countries of the temperate zones, are so situated, that in those which are near one of the fides of the torrid zone, the feafons are directly contrary to those of the other temperate zone. When it is fummer in one, it is winter in the other, &c. In these parts, nature shews more variety in the produce of the earth, and in animals than elfewhere. Wine is peculiar to these countries; for the vine cannot be cultivated, either in intenfely hot, or feverely cold climates. Mankind in particular have advantages under fuch climates. The inhabitant of the frigid zone are stupid, are short in stature; those of the torrid zone are of a weak conflitution, have warm passions,

and have less natural and intellectual powers than the inhabitants of the temperate zones. However varied the regions of our earth may be, the Creator has provided for the happiness of all who inhabit them. He ordains that each country should produce what is most requisite, according to the nature of the climate. A worm, which feeds on the leaves of the mulberry tree, spins for the people of the torrid zone a web. from which they take filk for their cloathing. A tree, as well as a shrub, bears a kind of hulk or shell full of fine wool, with which light stuffs are eafily made. On the other hand, the cold regions abound in quadrupeds; the skins of which serve for pelisses to the inhabitants of the morth; and they are furnished with thick forests, which fupply them abundance of fuel. That the blood of the inhabitants of the fouth, naturally heated, may not be too much inflamed, their fields and orchards give them cooling fruits in fuch plenty, that they may fend ample provision of them to other countries. In cold climates, God compensates for the want of the produce of the earth, by the great quantity of fish contained in the sea, and lakes, and by the number of animals they have. Animals which indeed live in the forests, and are a subject of terror to man, but at the same time furnish him with the finest furs, good food, and many materials for domestic use. Thus, there is no region in our globe, that does not feel the greatness and goodness of the Almighty. There is no country, however barren and poor we may suppose it, where nature is not bountiful enough to provide, not only the necessaries, but the comforts of life.

JULY XXII.

SINGULARITIES OF THE SEA.

HE fea is generally confidered only in a terrible light, without reflecting on the wonders and bleffings it fo vifibly prefents to us. It is certainly true, that the fea is one of the most dreadful elements, when its waves swell mountain high, and the tempest roars. It then often drives the ships out of their road, and tosses them fo violently, that they fill with water and are swallowed up. Sometimes the storm drives them on banks of fand, or rocks, where they are dashed to pieces. The whirlpools, or those maffes of water which make the ship turn rapidly round with their current, and end in finking or fwallowing them up; those whirlpools are occafioned by great cavities in the fea, where rocks and different currents meet. No less dangerous are the water-spouts which the wind raises from the fea up to the fky. They hover in the air VOL II.

above the ocean, and the wind whirls them round with violence. They often burst with great noise, and do much mischief; for they approach a thip, till the fails, and carry it away, then let it fall again, and dash it to pieces, or let it fink to the bottom. At least, if they do not carry it away, they break the masts, tear the fails, and fink the ship. Several vessels perish in this manner. But we should be very ungrateful to attend only to the mischief the fea does us, without reflecting on the goodness of God, which Thines forth even in the depths of the abyss. The first thing worthy of remark is the faltness of the sea. It is such, that a pound of water contains two ounces of falt. The sea salt appears lighter than what we use in common; and yet it is not drawn into the air, nor does it diminish by the continual flowing in of fweet water. The cause of this is not known. There may be mountains of falt in the sea; but if so, the sea would probably be more falt in some places than in others, of which we have no certain proof. It is possible that torrents and rivers carry into the fea, faltpetre and falt particles; but what would that be in fuch a vaft extent as the ocean? This falt quality, however, (be the cause of it what it may), was neceffary for several purposes. It prevents the water from corrupting, and contributes to make it heavy enough to bear the greatest burdens to be conveyed from one place to another. The

colour also of the sea water deserves our observation. It is not the fame every where. Befides, that in all water the colour of the bottom and of the fky appears in it; that it is black in deep abysses, white and foaming in a storm, filvered and gilded over, clouded with the most beautiful colours, when the rays of the fetting fun shine upon it. Besides all this, the different insects, marine plants, the mixture of many things which the rivers wash into the sea, vary its colour here and there. When it is calm, it fometimes appears strewed with brilliant stars. The track of a ship, which cuts the waves, is often luminous, and seems a river of fire. These phenomena must be partly attributed to sulphureous particles, oily and inflammable substances in the fea, and partly to shining infects. known property of the fea is the flux and reflux. Every day, or rather in the space of 25 hours, the sea twice rises and falls. When the tide rifes, it is the flux; and when it falls, it is the reflux. This phenomenon is attended with feveral remarkable circumstances.—There is always a flux and reflux at the same time in two parts of the globe, and those are opposite to each other. When our antipodes have high tides ours are the fame. The tide is always lowest when we are in the first and last quarter of the moon; and our highest tides are generally three days after the new or full moon. However, it may proceed from accidental causes, that the

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tide is fooner and higher one time than another. Though this phenomenon has not hitherto been perfectly accounted for or explained, it is still certain, that great advantages refult to us from it, both in purifying the water, and being useful for navigation. The creatures of which the fea is full might alone excite our wonder and admiration. Here a new world appears; and the number of beings of which it is composed is prodigious. The aquatic animals are not indeed fo varied in their species as the terrestrial; but they furpass them in size, and their life is longer than that of the inhabitants of the earth or air. The elephant and offrich are small in comparison of the whale, which is the largest fish the sea contains. Its length is often from 60 to It lives as long as an oak, and confequently no land animal's life can be compared to it. If we give credit to certain accounts, there are still larger animals than the whale in the sea; a fort of lobster, called kraken, in the northern feas, which is faid to be half a German mile in circumference. Who could even give a list of the feveral forts of animals which live at the bottom, and towards the furface of the fea? Who could tell their number, describe their form, construction, fize, and use of these different animals? How infinitely great is God! This is the conclusion we naturally must draw from fuch reflections. It is not without very wife reasons, that the Creator ordained that the

ocean and feas should occupy about two thirds of our globe. The feas were not only to be great refervoirs of water; but also, by means of vapours which arise out of them; were to become fources of rain, fnow, and other fuch meteors. How much wisdom there appears in the connection the feas have with each other, and the continual motion the Creator has impressed upon them! It is no less worthy of observation, that the bottom of the ocean is of the same nature with the furface of the terra firma. There are found in the fea, rocks, vallies, caves, plains, fprings, rivers, plants, and animals. The islands in the fea are only the tops of a long chain of mountains. And when we confider, that the fea has been less examined than any other part of the globe, we have reason to believe, that it contains still a number of wonders, to which neither the understanding nor the fenses of man are adequate; but which all prove the power and wisdom of God.

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JULY XXIII.

SEVERAL SHADES OBSERVABLE IN FLOWERS.

VITH a heartfelt pleasure I cast my eyes around, and every where discover the numberless beauties the creation affords. What a lovely affemblage of colours I behold! How pleafing and how varied the mixture! What wonderful art in the disposition of those shades! There, a light pencil feems to have laid on the colours. Here they are blended according to the most exact rules of art. The colour of the ground is always fuch as best throws out the drawing, whilst the green, which surrounds the flower, or the shade which the leaves cast upon it, serves to set off the whole. In thus distributing and varying the colours, our gracious God feems to have had no other view than to procure us agreeable fensations.

The more we examine works of art, the more defective they appear. The more we observe the works of God, the more their beauty charms us, and we continually discover new marks of greatness in these master-pieces of a divine hand. What seems most pleasing, in the shades and colours of slowers, is their simplicity. One would suppose, that the Creator must employ an infinite number of materials, to

embellish nature in such a manner, and to distribute amongst the flowers and plants so many bright, rich, and beautiful colours. But God has no occasion for painful exertions, to make the creation a scene of wonders. One fingle element, under his hand, affumes variety of beautiful forms. The moisture of the earth and air penetrates into the fibres of plants, and there filters through a train of transparent stalks. This is what works all the wonders, and produces all the beauty we behold throughout the vegetable kingdom. It is the fole cause of the charms, the perfume, and growth of flowers. If each colour had its particular cause, the surprise of the spectator would lessen; but we contemplate with pleasure, and can never tire of admiring the effect of a profound wisdom, a work which, though varied in its parts, is still simple in respect to its cause, and wherein we behold a multitude of effects depending on one fingle fpring, which always acts in the fame manner. At this moment, while I examine the variety of tints which colour the flowers, I feel more than ever the value of the reason with which I am endowed. Without that faculty, I should be deprived of the enjoyments they afford, and flowers would exist in vain for me. But my reafon points to me the numberless beauties of flowers, the infinite variety of the colours and shades, which the fields, the valleys, the mountains, and the forests present to us. I not only

know them, but am sensible of their beauty, and take a pleasure in them. I can do still more: I can from each flower raise my thoughts to the Creator, and find, even in their colour, traces of his perfection. How can I sufficiently express my gratitude for a gift, that enables me to enjoy these beauties of nature, these wonderful works of God!

JULY XXIV.

THE GREAT HEATS IN SUMMER

Tris generally at this time we experience the greatest heat. Perhaps it may appear extraordinary to be told, that the sun which now enters into the sign Leo, is daily removing from us. When we were nearer to the sun the heat was temperate, and now we are removed farther from it, the heat is at the height. This phenomenon agrees, however, with the laws of nature; and it is in the formation of our globe, that we must seek the reason of it. The sun was nearer to us lately, but as its rays were not strong enough to penetrate deep into the earth, we could only perceive a moderate warmth; yet, in the space of some weeks, the earth and the bodies upon it, are so far heated, that even a less

degree of the fun produces more effect than in the beginning of the fummer, when it acted upon cold bodies. This plan of nature displeases many; they complain of this burning heat which weakens us, and makes us incapable of But is it not unreasonable to much labour. murmer at a plan which being founded on the immutable laws of nature is of courfe inevitable! Is it not ungrateful to our heavenly Father, to blame his government, which in the end never fails to produce the welfare of the world? And can any one seriously wish this seafon less hot? Because the heat is inconvenient, would we therefore wish the fruits, which are to ferve for next winter's food, not to ripen? I repeat, that our murmurs are ungrateful to the Creator, who foftens and compensates for every evil, by certain advantages annexed to them: for example, the inhabitants of the western parts of Africa, and particularly those of Cape Green, and the island of Goree, are exposed the whole year to the intense heat of the fun; but their bodies are fo formed, that their health does not fuffer from it; and the winds which blow continually in those countries, serve to temper and cool the air. Is it probable that the Creator should show less goodness to us in this respect? O how unpardonable, if ever we are infensible to the proofs he gives of it, even when we are oppressed with heat! Is it not, in the first place, an effect of his tender mercy,

that the fummer nights are so calculated to cool the air? The nights bring with them a coolness which prevents the air from dilating; and enables it to act fo much the more forcibly on every thing. One fingle night revives the languishing plants; gives new vigour to the weakened animals; and so refreshes us, that we forget the weight and fatigue of the day. The storms even which terrify us, are means in the hands of the Creator, to cool the air and moderate the heats. How many fruits also are there of a cooling quality, which abate the acrimony of bile. A relief fo much the more valuable, as the poorest among us may enjoy it. Let us cease then to complain of the heat of the fun, or the weight of fuffering we labour under. They both belong to the plan of divine Wifdom.

JULY XXV.

Several Things remarkable in Animals.

O F all parts of nature, it is the animal kingdom which affords the greatest wonders; and, to a lover of natural history, the different instringts and properties of animals are a very interesting study. But, to a resecting being, it is

fomething more than merely an agreeable object. The animal operations teach us to trace them back to a wisdom we cannot fathom, because it surpasses all human conception. This is the effect I wish to produce, by pointing out the fingularities observable in certain animals. The manner in which birds and infects lay their eggs is worth remarking. The grashopper, the lizard, the tortoife, and crocodile, never trouble themselves about their eggs, nor the young ones that are in them. They lay their eggs in the earth, and leave to the fun the care of hatching them. Other animals, by a natural instinct. lay their eggs in places where the young find food the moment they are born. The mothers are never mistaken. The butterfly proceeding from the cabbage-caterpillar, will not lay its eggs on meat, nor will the fly which lives on meat, lay eggs on cabbage. Certain animals are for careful of their eggs, that they carry them with them wherever they go. The spider called the wanderer, carries hers in a little filken bag. When they are hatched, they range themfelves in a particular order on their mother's back, who goes about with this load, and continues to take care of them for some time. Certain flies lay their eggs in the bodies of living insects, or in the nests of those insects. It is well known, that there is not a plant which does not serve to feed and lodge many infects. A. fly pierces through an oak leaf, and lays an egg

in the hole it has made. This wound quickly closes. The place it was in swells, and there foon appears upon it an excrefeence, which they call the gall-nut. The egg that was contained in the growing gall-nut grows with it, and the infect finds both lodging and food as foon as it is born. The care of animals for their young is scarce credible, and their love of them fometimes furpasses their love of life. With what tenderness the quadrupeds nurse their young! They cure their wounds by licking them'; they convey them from one place to another, when any danger threatens; they keep them close to them, defend, and guide them. If they are carnivorous, what pains the mother takes to get them meat! With what art she teaches them to catch their prey, to amufe themselves when they have got it, and then to tear it in pieces. It is impossible without emotion, to read the account of a bitch, who, while they were diffecting her, still continued to lick her young ones, as if to feek relief from her fufferings in this maternal care, cried out lamentably the moment they were taken from her. The fea dog, during a storm, conceals its young under its belly, from whence they come out again when the fright is over. Each species of animals has its peculiar inclinafions and wants. The Creator provides for both. Let us, for example, confider those which are obliged to feek their food in the water, and particularly the aquatic birds. Nature has covered

their wings with a gluey oil, through which the water cannot penetrate; by this means they are not wet in diving, which otherwise would prevent their flying. The proportion also of their bodies differs from that of other birds. Their legs are placed more behind, that they may stand up in the water, and stretch their wings above it. To enable them to fwim, their feet are furnished with webs. For the purpose of diving they have been given a particular form of body; and for that of feizing their prey, nature has provided them with large bills and long necks. In a word, they are formed as their way of life requires they should be. The nautilus is a fort of shell-fish, something like a fnail. When it wishes to ascend, it places itself on the fore-part of its shell; and to make itself lighter, it throws out the water. If it wishes to descend, it withdraws into the bottom of its house, which then fills with water, and becomes heavy. If it wishes to fail, it artfully turns its shell, which becomes a little gondola, and then it stretches out a thin slight membrane, which fwells in the wind, and ferves as a fail. Perhaps it is from the nautilus that mankind have learned the art of navigation.

It is with the actions of animals, as with their make. The fame wisdom which formed their bodies, their limbs, and appointed them a common use has also planned the different actions we see them perform, and directs them accord-

ing to that purpose for which they were created. The beaft is led to it by the invisible hand of its Creator. It produces works which excite our admiration, and appears to act from reason. It stops when necessary, plants its work according to circumstances, and yet only follows certain secret fprings, which make it move. It is an instrument which cannot judge of what it executes, but is directed by the adorable wisdom of our Creator, which has circumfcribed each infect, as well as each planet, within a sphere, from which it cannot deviate. When, therefore, I observe the instinct and the industry of animals, I feel a fentiment of veneration, and think I behold a fcene, where the almighty Author conceals himfelf behind a curtain. But, whoever reflects feriously on the works of nature, will every where discover the finger of God; and the examination of the wonderful construction of created beings will fill him with constant gratitude and respect for the Creator.

JULY XXVI.

THE HUMAN FACE

EVEN the outward part of the human body declares the superiority of man over every other living creature. His face directed towards the

heavens proclaims his dignity; which is fo far imprinted on his features, that one may, in fome measure, judge from the countenance of man what the importance of his destination is. When the foul is in a perfect state of tranquillity, the features are calm and composed; but when the foul is agitated and diffurbed, the countenance becomes a lively picture, wherein the passions are painted with equal force and delicacy. Each affection of the mind has its particular impressions, and each change in the features is the characteristic of the most secret emotions of the heart. The eye, in particular, so visibly expresses them, that we cannot mistake it. It is more immediately the organ of the mind than any other. The most turbulent passions, and the gentlest affections, are painted with great exactness in that mirror. The eye may therefore be called the true intrepreter of the foul, and the organ of the human understanding. The colour of the eyes, their motions more or less quick, contribute much to mark the character of countenance. Although the eye appears to go several ways, it has, in fact, but one manner of moving, which is the turning round its centre. Our eyes are in proportion nearer to each other than those of any other living creature. In most animals, the space between is so great, that it is impossible for them to see the fame object at once with both eyes, unless it should be placed at a great distance. The eye-

brows and eyes are what most form the countenance. Those parts being of a kind quite different from the rest, their particular colour makes them more striking than the other features. The eye-brows are the shade of the picture, which throws out the drawing and colouring. The eye-lashes, when they are long and thick, contribute much to the beauty of the eye, and give it a more pleasing look. It is only mankind and monkies, who have both eye-lids adorned with eye-lashes. Other animals have none on the lower eye-lid, and man's upper eye-lid has more than the lower. The eyebrows have but two fort of motions, which are performed by the affiftance of the muscles of the forehead. By means of one they rife, and by means of the other they fall down and draw together. The eye-lids guard the eye and prevent the cornea from drying. The upper one can of itself rife and fall. The under one moves but little. Though we can at will move our eyelids, it is not in our power to keep them open when fatigue and fleep weigh them down. The forehead is a very important part of the face, and adds confiderably to its beauty, if it is well proportioned, neither too full nor too flat, too large or too fmall, and if the hair growing well forms the outline and ornament of it. The nofe is the part of the face which projects most, but is the least moveable; and as it is seldom put in protion but in violent passions, it serves more

for the beauty of the whole than for any expression resulting from it. The mouth and lips, on the contrary are susceptible of many changes; and, next to the eyes, it is the mouth which best expresses the passions, by the variety of forms it assumes. The organ of the voice also helps to animate and set it in play. The red colour of the lips, and the whiteness of the teeth, add to the charms of the face.

We have hitherto only examined the human face relatively to the regularity and beauty of the parts which compose it, without discovering the use and several purposes of those parts. But under this one point of view we already perceive the infinite wisdom of him who has, throughout all his works, united the useful with the beautiful.

JULY XXVII.

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ON THE GRAVITY OF BODIES.

GOD has endowed bodies with a force, which acts at all times, in all places, and in all fenses. If a body endeavours to move towards one point more forcibly than to another, we say that it gravitates towards that point. For experience teaches, that bodies are inclined to descend:

or, that if they are far from the surface of the earth without support, they fall on it in a perpendicular line. It is by no means in the body itself, that we must seek the cause of its weight; · for a body which falls remains in the state it was put, till fome exterior cause changes it. It is equally impossible that the air should occasion this gravity, fince being itself heavy, it ought rather to lessen the swiftness of the fall of bodies. We must therefore seek the cause elsewhere. Perhaps the opinion nearest truth, is that which supposes the earth to have the virtue of attracting bodies placed at a certain distance, as the magnet attracts iron. Or elfe possibly it may be imputed to a foreign substance distributed throughout all bodies. But though we cannot politively ascertain the cause of weight, nothing is more evident than the advantages which accrue from it. Without it we should not be able to move as we do. Our centre of gravity is about the middle of our bodies. When we raise the right-foot, we make the left to be the centre: if we then bend our body forward, we are near falling; but, by putting out the rightfoot, we prevent the fall and make a step. Thus our walk is, in some respects, a continual course of falls; during which the centre of gravity is preserved between our feet. This is the reason we bend forward in going up a hill, and backward in coming down it. We also lean forward when we carry a load on our shoulders,

and backward when we carry it before us. All this is according to the laws of gravity, which govern the motions of animals when they walk, fwim, or fly. These same laws govern the motions of the immense bodies which roll in the firmament: the fun attracts the planets; and each planet in its turn attracts its fatellites : or, what is just the same, the planets gravitate towards the fun, and the fatellites towards the planets; for a body made to turn round continually, flies in a direct line from its centre, if it meets with no obstacle in its way. It is with the greatest swiftness that the planets run their course; and the moon is not fastened by a chain to our earth. It seems then, as if a motion so rapid as that of the moon, must throw it very far from us in the immeasurable space, if there was not a force which continually pushes it towards our globe; and which counteracts the force that removes it from hence. That first force is the gravitation of the moon towards the earth. If our earth was either lighter or heavier than it is, what would be the confequence? It would either draw too near or too far from the fun. In the first case the heat would be insupportable; and in the latter, the cold would be equally fo: every thing in our globe would be confumed or frozen. What would then become of the feafons, and a thoufand things fo indispensable for man, and so neceffary for his happiness?

Here again, then, the supreme Wisdom shews itself wonderfully. By a means so small in appearance, motion is given to the celestial bodies, and to all animals. By the laws of gravity alone, the least grain of fand is prevented from being lost, upon this or any other globe. But it is in this that the greatness of God's power and wisdom consists, that often the greatest, and most astonishing effects, are produced by means that appear to us the most insignificant.

JULY XXVIII.

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Number of Effects in Nature Proceeding from one and the same Cause.

THE whole of nature is one endless chain of causes and effects; and as all parts of the universe are connected together, each motion, each event depends on a preceeding cause; and will, in its turn, become a cause of the effects which follow it. The whole constitution of the world may convince us, that it is not chance, but a divine power, and a wisdom beyond all conception, which first erected this wonderful fabric, and impressed motion upon its different parts, and regulated the great chain of events depend-

ing an and fucceeding each other. This degree of knowledge is not difficult to acquire; for though that which we have of nature is very limited, we still fee numberless important effects derived from causes evident to the human understanding. Many natural phenomena may furnish examples of this. What variety of effects does the heat of the fun vilibly produce! It not only contributes to preserve the life of multitudes of animals, but also to the vegetation of plants, the ripening of corn and fruit, the fluidity of water, the exhalation of vapours, and formation of clouds, without which neither rain nor dew would fall upon the earth. The air likewife is fo constituted as to sulfil several purposes at once. By means of this element the animal bodies are preserved, the lungs are relieved, and all the vital motions acquire force. It is the air which kindles fire, and nourishes the flame. The air, by its motion and undulation, conveys every fort of found to the ear. It gives a spring to the winged animals; and enables them to fly from place to place. It opens to man an eafy passage through the seas; the wast expanse of which he could not otherwise cross over. It is the air which supports the clouds in the amofphere, till becoming too heavy, they fall again in rain. It is the air which prolongs the day by morning and evening twilights; and without it, the gift of speech, and the fense of hearing would be useless to us. All these bleffings, and

many more, depend on the formation of the air in which we live and breathe. This wonderful element which furrounds our globe, which is too fubtile to be visible to us, and yet so strong that no element can refult its force, is it not a firiking proof of the wildom of our Creator? The force of gravity alone, which exists in every thing, holds the earth firm, preserves the mountains, and renders water fluid. It confines the ocean in its depths, and the earth within the circle prescribed. It maintains each being in its place throughout all nature; and preferves between the celestial bodies the proper distance from each other. Who can describe the many properties of water! In general it ferves to dilute, to foften, to mix a great many bodies which we could not otherwise make use of. It is the most wholesome drink: it is the best nourishment for plants: it turns mills and several other machines: it procures us fish, and brings to its furface the treasures of another region. How various and innumerable the effects produced by fire! Solid bodies are either melted and made fluid, or become again folid bodies of a different fort. It makes fluids boil, or reduces them to vapour; and gives heat to all other bodies, and contributes to give the fensation of fight to living creatures.

It is not only in the natural world that we fee the greatest variety of effects produced by the same cause: in the moral world also, one

fingle disposition of the mind produces no less variety of effects. Let us, for example, consider the natural inclination we have to love one another. From hence is derived the care of parents for their children; focial ties; the connection of friendship; patriotism; goodness in those who govern, and fidelity in those who obey. Thus one fingle propenfity keeps each individual in the circle prescribed; forms the bond of human fociety; is the principle of all virtuous actions, of all laudable pursuits, and of all innocent enjoyments. All these are most evident proofs that the world is not made by chance; neither are the materials which compose it, without connection or relation to each other. On the contrary, the world forms a regular whole, which divine power has ordained with infinite wisdom. In each part, in each phenomenon of the visible world, we discover traces of it. Yet there is much more which escapes the deepest observations of the greatest capacities, for we cannot trace it in all its different lights. positive a dr estitue rid months git anis

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JULY XXIX.

Some MALADIES IN PLANTS.

V EGETABLES are subject to several maladies. Sometimes they are covered with a whitish matter, which flicks to them like duft. It does not proceed from infects, as is generally believed, but from a natural stagnation in the juices, and a beginning of corruption, which attracts the infects, and invites them to lay their eggs upon it. The stagnation of the juices is the first stage of corruption; and it is supposed that this alone is sufficient to attract insects, because they are feen swarming by millions, as foon as the circulation of juices is stopped in a tree, either by natural or other causes, though we know not why or how it happens. This is the reason that the weakest and worst situated trees are the most frequently subject to this malady. If the infects were the cause of it, it could not be produced by art, whereas, if a tree is wounded defignedly, or by neglect, it will immediately bring the mildew. On a tree, thus weakened by art, millions of infects fettle at once, while the neighbouring trees are free from them. Therefore, this corruption should no more be imputed to infects than that of meat; it is caused by the stagnation of the juices, an accident which many circumstances may occasion. There is often fomething refembling dew, but which

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is glutinous, fweet, and corrofive, that burns and spoils the plants. It was imagined that the infects conveyed this glutinous juice into vegetables, or that the bees carried their honey there. But, after many experiments, it is now allowed to be afcertained, that this matter falls from the air in the form of dew. In some countries, it lies in little drops on a number of vegetables of different forts, without distinction; and, in the space of a night, it covers almost all the leaves of a long row of trees, on which there was none before. Perhaps this dew is formed from vapours, rising from flowers and from blossoms of trees, out of which the bees extract fuch good honey; and, if it falls more in one place than another, it is owing to the direction of the wind. Perhaps also this matter may be the effect of malady in the plants, when the juices are hurt, which may attract infects, like the dust beforementioned; for it is the boughs, branches, bushes, and weak trees that most frequently suffer from this malady. It is also observed, that the leaves on which this fort of dew falls, spots, blackens, and spoils, and very possibly this substance may be the cause of it.

Here again we find traces of the wildom of the Creator, for as the infects require food to live upon, it is for our benefit that they should be obliged to seek it in vegetables, which, being spoiled, are become useless or hurtful to us. By

this means, the animals do not deprive us of our food, but, on the contrary, chuse what would be hurtful to us. It is true that, according to the course of nature, each plant, each tree, and even each animal serves to support some kind of animal. We revenge ourselves on the species which hurt us, and seek as much as possible to destroy them. Perhaps we should be more disposed to spare them, if we considered how little real harm they do us.

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Means of Subsistence which Nature

IT is one of the great effects of divine goodness and power that there is every where sood enough to maintain all the living creatures with which the world is filled. It is not indeed wonderful that the countries under the temperate zone should furnish subsistence for those that live there; but that it should be the same every where else, even where it could be least expected to find food and pasture, and that such different kind of animals should never fail of provition, can only be attributed to the care of a wise and beneficent Providence.

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Let us, in the first place, observe, that God has proportioned the provisions to the number and wants of the animals which are to confume They are almost every where to be found in abundance; but they are not in such profusion as to spoil or corrupt, which would be an evil to us. It is certainly very remarkable, that amongst so many forts of food, the most uleful and necessary are in general the most common, and multiply most easily. As there are a great many creatures which feed on grafs, there are great numbers of fields covered with grafs, herbs, and falubrious plants, which grow of themselves, and result the inclemency of the air. Is it not worthy our attention, that corn, the principal food of man can be fo eafily cultivated, and so aftonishingly multiplied? For example, a bushel of wheat, if fowed in a good foil, may produce a hundred and fifty bushels Is it not by a most wife direction of the Creator, that the tafte of animals is so different? that some love to feed on herbs, others on corn, others on meat, worms, infects, &c. Some are content with a little; others are almost insatiable. If all fort of animals fed on the fame thing, the earth would foon become a wast soli-This divertity of tafte among beafts is a certain proof, that it is not by chance they like. fuch and fuch food, but is owing to a natural instinct which inclines them to food adapted to the nature of their bodies. By this means all

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the productions of the earth and sea are well disposed of. Not only every thing that breathes is richly provided for; but even that which by corrupting might be a nuisance, serves for useful purposes. For the most wholesome plants would perish, the carcases of sish, birds and beasts would exhale a destructive poison, were it not for the wise direction of the Creator, who ordained, that different animals should chuse these

things for their food.

Food spontaneously offers itself to most beasts; but they require the art to discern it, and must be prudent and cautious. Their provisions are so prepared, that what is useful to one species is hurtful to another, and turns to poison. Botanists have found, from several experiments, that cows eat of 276 forts of grass, but that they reject 218; that goats make use of 440, and that there are 126 which they do not touch. Sheep feed on 387, and there are 141 which they do not eat. The horse grazes on 262, and rejects 212. Swine are content with 72 vegetables, but there are 171 which they will not make use of. Other animals are obliged to feek their food with labour and afar off, to dig for it into the earth, or to collect it from a thousand places where it is scattered about, or even to bring it out of another element. Many are obliged to chuse the most favourable time of night to fatisfy their hunger in fafety; others to prepare their food, to pick the feeds out of their

shells, to bruise them is hard, to swallow little stones to assist digestion, to take off the heads of the insects they seed on, to break the bones of their prey, to turn the fish, in order to swallow them by the head. Many would perish if they did not convey suture provision to their nest. Others cannot catch their prey, without laying snares or digging holes for them. Some pursue their prey on land, others in the air, and under the water.

The more varied the food of animals, and their manner of procuring it, the more admirable is the wisdom and goodness of God in the preservation of these creatures.

JULY XXXI.

VARIETY IN THE STATURE OF MAN.

THE entire height of the human body varies confiderably, and the more or the lefs is of little confequence. The usual height is from five to fix feet. Some people who live in the northern countries along the frozen feas, are lefs than five feet. The least people of those known to us, inhabit the top of the mountains in the island of Madagascar; they are scarce four feet high. Many of these dwarfish people come originally

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from nations of a common stature; and the cause of their degeneracy must certainly be imputed to the climate they inhabit. The extreme cold most of the year there, makes both animals and vegetables small; why should it not have the same effect on man? On the other hand, there are whole nations of a gigantic fize; the most famous of them are the Patagonians, who live near the Streights of Magellan. It is afferted that they are from eight to ten feet high. Neither ought it appear to us impossible that there should be people taller than the Europeans. Besides the traces that remain of it in history, and in the monuments of antiquity, there have been feen even in our climates, men fometimes above fix feet and a half high; who were, notwithstanding, well proportioned, healthy, and capable of all the exercise and labour which require strength and activity!

Adorable Creator! thy wisdom is evident also in these varieties of human mature. All that thou hast brought forth in the animal, vegetable, and mineral kingdoms, has been done by weight, number, and measure. Every thing bears thy stamp: the dwarf as well as the giant; the blade of grass as well as the oak;

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AUGUST I.

MEDITATION ON THE WORKS OF NATURE.

FATHER of the universe! Preserver of all that breathe! how great is thy majefty, and how many wonders thou shewest unto man! It is the hand which has stretched out the heavens, and fet them thick with stars. Now, at this moment, I behold the fun, thining in all its splendor, to reanimate nature. To-morrow. perhaps, it will be no more for me that the birds make the woods, the fields, and the vallies refound with their melodious notes. I feel that I am mortal; my life fades away like the grafs of the field: it withers as a leaf fallen from the branch where it grew. Who knows when these words of the Almighty will be heard by me: Man, return to dust! When the grave shall have fwallowed me up, when darkness and filence came upon me, when the worms have gnawed my flesh, what will then remain of earthly poffessions? Will not all be lost to me, though even all my wishes had been gratified, and I had here enjoyed unmixed happiness?—O how fenseless should I be, were I to attach myself to the transitory bleffings of this world! If I aspired to great riches, if I was ambitious of vain honours, and if allowing myfelf to be dazzled by vain splendor, envy and pride should take possession of my heart; if too eager in my wishes,

I have purfued what I ought not to aspire to, I humble myself before thee, O God. Behold here I am, may that which thou in thy wisdom directeth happen unto me. Man, a being mad with pride, prescribes laws to his Creator! he dares to blame the decrees of eternal wisdom! And thou, almighty Friend of man! thou lovest them more than they love themselves, when thy goodness refuses them the deceitful enjoyments which are the objects of their wishes. When, in the morn, on the green turf covered with dew, every thing presents me a cheerful prospect, and the wings of the night have cooled the burning heat of fummer, wisdom cries out to me, O mortal! why dost thou harbour cares? Why yieldest thou thyself to anxiety? Is not God thy Father? Art not thou his child? Will not he who made thee, take care of his own work? The plan of thy existence is not limited to this earth, it takes in heaven. Life is but a moment; and the longest earthly felicity is but a pleafing dream. O man! thy destination is immortality. The thought of immortality raises us above the earth, the universe, and time. It shall awaken my heart, when seduced by false pleafures, I am inclined to quit the path of virtue. The rofes which crown the head of the wicked man foon fade. His shameful enjoyments dishonour him, and repentance succeeds them. I am but a sojourner upon earth, and none but immortal joys deferve pursuit.

AUGUST II.

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VEGETATION OF THE BLADE OF WHEAT.

HE blade of wheat is composed of the principal stem, of the stalks growing out of the sides, and the stalks which afterwards spring out of those. It begins to form as soon as four green leaves make their appearance. If the little plant is then taken, and the under leaf is cautiously pressed, or separated, there will be seen a little white point, which gradually grows into a stalk; and under the first leaf the little root appears. The white point springs out of the substance of a knob, opens into green leaves, and shoots out on the fide a new point. But these several points, and the stalks they produce, are not all defigned to bear fruit. Many of them wither, and are loft. When the principal stem has taken growth, there is a confiderable revolution in the plant, and all the fap is then employed in the formation of the bloffoms and fruit. But before that, when the plant begins to vegetate, there are four, and fometimes fix leaves, which fpring from fo many knobs. They prepare the nutritive juice for the ear of corn, which is feen in. miniature in fpring, upon opening a stalk through the middle. Even in autumn, this ear of corn, which may be feen, in the form of a little cluf-

ter, when the knobs are flill very close together. When the plant begins to bud, the two upper leaves of the stalk join together, inclose the ear of corn, and protect it, till it has acquired fome confiftency. Before that happens, all the knobs, and particularly the two last, though foft, are very closely connected, and very little space between them. But, as soon as the ear of corn has pierced through its coats, all its parts lengthen, and the leaves give them all the juices they contain. By degrees the knobs harden, and the under leaves dry up; and the juices which nourished them, are no longer used but in firengthening the stem. After all these preparations, the bloffom appears, which furnishes the fruit with its best nourishment. This bloffom is a little white stalk, extremely slender, which comes from the Juice of the grain. Several other little stalks furround it. They are at first vellowish; afterwards they grow brown, and at last become blackish, a little before they fade and fall off. The chief wfe of thefe falks, is to nourish a little cluster, which is in the bag of grains. As foon as the corn has done blofforning, there appear grains, which contain the germ, and which come to perfection long before the meally fubstance appears. This substance gradually multiplies, while the fap collects round a part extremely fine and delicate like down. This down, which exists longer than the bloffoms, ferves, among other things, to support

the opening of the principal pipe that goes. through the corn. The fruit ripens, as foon as it has attained its full growth. Then the stalks and the ear whiten, and the greenish colour of the grains become yellow or dark brown. Thefe grains are still however very foft, and their meal contains much moisture, but when the wheat is quite ripe, it becomes dry and hard. The wifdom which appears in the construction and vegetation of corn, cannot be too much admired. To those who have the habit of reflection, it will appear in the smallest blade. The leaves, for example, which furround it, before it has attained its full growth, even those leaves have their use, and it seems as if the wisdom of the Creator had placed them round the blade for the fame reason that an architect raises a scaffolding about a building, which when the building is finished, he takes away. For, as soon as the blade has attained its full length and confiftency, the leaves which protected it dry up, and fall off. Whole months pass away, before the ear of corn ventures to appear and expose itself tothe air; but, as foon as every thing is prepared for the formation of the bloffoms and fruit, they all appear in a few days. With what skill also are the stalks and the ear of corn constructed! If the former were higher, the nutritive juice could not so well penetrate into them; if, on the contrary, the corn had been placed lower, the moisture would have made it spring up, and

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before it was reaped, birds and other animals would get at and destroy it. If the stem was weaker and smaller, the wind would break it; and, if it was stronger and thicker, little animals might lodge in it: birds would perch upon it, and pick out the grain.—When we behold a field of wheat, may we experience all the sentiments of love and admiration, which the goodness of God ought naturally to excite.

AUGUST III.

THE DOG-DAYS.

HE fun, besides its diurnal motion, which appears to convey it from east to west, and which occasions the revolution of day and night, feems evidently to have another motion from west to east; by means of which, at the end of 365 days, it comes again near the fame stars from which it had removed for fix months, and to which it was drawing near the other fix months. On this account, the ancient astronomers divided the feafons according to the flars which the fun meets in its annual course. They divided this course into twelve constellations. which are the twelve figns of the zodiac, called the twelve houses of the fun; because it seems to dwell a month in each of them. The fummer begins with us when the fun enters the fign Can-

cer, which happens the 21st or 22d of June. It is then that the fun is raised at the highest above our horizon, and darts its rays almost directly upon us: and of course at that time begins the heat of fummer, which always increafes in the following month, by degrees, as our globe is more heated by the burning rays of the fun. This is the reason that July and part of August is generally the hottest part of the year, and experience has proved, that from the 20th of July to the 20th of August, the heat is at the height. Now, of all the stars in conjunction with the fun, the dog-star is the brightest. Lost in the rays of the fun, it disappears from us for a month, as is the case with every flar which the fun meets in its course, and the month of its disappearing is the time of the dogdays. These observations would be of little importance, were it not to remove a rooted prejudice amongst many people. An ancient tradition attributes the heat usually felt at this time, to the influence of the dog-flar upon the earth and its inhabitants. This opinion is proved to be abfurd, from this circumstance alone, that the concealment of the dog-star, in the rays of the fun, does not take place in the time we call dog-days. Those days, properly speaking, do not in reality begin till the end of August, and they terminate towards the 20th of September. And, as the dog-flar, or the Sirius, always advances farther, it will attain in time to

the months of October and November. It will at last be found to fall in the month of January, and we shall then, in the dog-days, experience fevere cold. When we reflect on this, we may plainly fee, that it is impossible this far should occasion the great heats which we suffer, or the effects they produce. When, therefore, in the fupposed dog-days, the wine or beer spoils in bad cellars : when things liable to ferment turn four; when flagnated waters dry up, as well as the fprings; when dogs and other animals, and men also are seized with madness; when we are attacked with diforders, which imprudence in that weather draws upon us; this does not happen, because a star conceals itself behind the fun. It is the extreme heat of the air, at that feafon, which is the fole cause of all those effects. It is time indeed to throw off a prejouice, which does to little honour to the human understanding. Whoever can suppose, that certain figures, which the imagination forms to itself in the sky, can have any influence on our globe, and on the health and reason of man, discovers great want of judgment. It is not the flars, it is generally outselves, which we ought to accuse of the evils we suffer. If then there should be at those seafons dangerous maladies, let us not impute them to the influence of the dog-ftar, which is entirely chimerical! let us rather believe they proceed from our misconduct and neglect. If we consider the point feriously, we fin against a

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Can we suppose an infinitely good Being, the Ruler of the world, to have created any thing, in the heavens or in the earth, to be a torment and misery to his creatures? If we believe in such as an inevitable fatality, we cannot admit or acknowledge a Creator, the effence of wisdom and goodness. Instead of being guilty of such an error, let us secure our own peace, by believing ourselves to be under the protection of a merciful Father, contrary to whose will, not even a hair can fall from our heads.

AUGUST IV.

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WE fall asleep more or less quickly according to the constitution and state of health. But be it quick or slow, it is certain it comes always in the same manner, and the circumstances which precede it are the same in all men.—The first thing which happens when we are falling asleep, is a stupefaction of the senses, which no longer receiving exterior impressions stacken and gradually become inactive. From thence, the attention sails, and is lost; the memory is confused; the passions are calm; the train of thought and reasoning become irregular. When

we perceive fleep coming, it is but the first step, it is not yet fleep; it is but dozing. When quite afleep, we have no longer that consciousness, that fixed idea of ourselves, which requires memory. To the stupefaction of the senses is soon added a stiffness of muscles. This is the fecond degree towards fleep. This state produces feveral fymptoms in the machine, which may be observed in those who sleep in a chair. The eyes wink, open, and shut of themselves; the eye-lids fall down; the head totters and falls forward. We endeavour to support it, but it falls still lower down, and we have no longer strength to raise it up. The chin rests on the bosom, and we sleep, quietly in this attitude. If our fleep is found, all voluntary or animal functions are suspended, but the natural or vital functions are performed with the more force. This is the third change which sleep occasions in us. Digestion is better carried on while we sleep. When awake, the natural motions are sometimes interrupted by the voluntary, and the fluids are quickened in some vessels, and retarded in others. The blood is wasted in external actions, and confequently, does not flow through the internal parts fo abundantly. The circulation of our blood is very strong in those parts of our bodies which are in motion, and it is continually preffing the humours in the fecretory vessels; whilst, on the contrary, it is so weak in the others, that the chyle can fcarcely turn into blood. A fweet sleep restores the balance

every where. The veffels are equally open; the juices flow uniformly; the warmth is preserved in the same degree. In a word, nothing is loft, and all contribute to the good of the machine. From these circumstances it is, that, after a found fleep, we are rested, refreshed, active, and firong. Will not these reflections make us sensible of God's goodness towards us? What preparation, what tender care to procure us the bleffing of fleep! It particularly deserves our grateful attention, that sleep is attended with an entire heaviness of the senses, and seizes us unawares, without being able to avoid it. The first of these circumstances makes it more found and refreshing; the second makes it an inevitable necessity. And what admirable wifdom of Providence in the regulation of the mufcles during fleep. The first which grows stiff is intended to guard one of our most precious organs, and that which is most exposed to danger, the eye. As foon as we grow fleepy, the eye-lid closes of itself, covers and protects the eve till we waken. In other parts of the body the muscles contract with more force, because their being relaxed might be dangerous and inconvenient. Let then the hours in which we are disposed to enjoy the sweets of sleep be ever a time of gratitude towards our heavenly Father. Let us bless him, not only for the days happily fucceeding one another, but for having So formed us, that sleep refreshes and strengthens us. Let us fall asleep with these thoughts, and let them be the first that come into our minds when we awaken.

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AUGUST V.

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DIVISIBILITY OF BODIES.

WE may easily be convinced of the infinite divisibility of bodies, by only walking in a garden, and breathing the feveral perfumes which the plants and flowers exhale. How inconceivably small must the fragrant corpuscles of a carnation be, which divides, spreads over a whole garden, flies every where, and reaches our fmell! If this is not a fufficient instance, let us consider other objects in nature; and, for example, let us cast our eyes on a filk thread, the work of a poor worm. Let this thread be 360 feet long, and yet it will weigh no more than a grain, that is to fay, the feventy-fecond part of a drachm. Let us next confider into how many parts a length of 360 feet may be divided, even To as to have each part perceptible. An vinch may be divided into 600 equal parts, each of which is the thickness of a child's hair, and confequently visible to the naked eye. Of course, a fingle grain of filk contains at least 2,502,000 parts, each of which is visible with-

out a microscope. And as those same parts may fill be divided into feveral more millions of other parts, a division which may be continued always farther by thought, it is evident that this progression may extend to infinity. The last particles which cannot be feparated by human industry, might fill however have extent; and, confequently are capable of division, although vit cannot be done in this world.

If we examine the animal creation, we shall discover fresh proofs of the infinite divisibility of matter. A great naturalist put pepper tinto water, and, by means of a microleope, he discovered in that water a multitude of animalecula, which were a thousand million of times smaller than a grain of fand. How inconceivably small, then, must be the feet, the organs of efense, the muscles, the veins and nerves of fuch animalcula? What must their eggs be, their young the limbs of the young ones, their veffels, and the juices which circulate in them. Here our imagination is lost, our ideas are confounded; and yet nothing is more certain than what is faid here. It is particularly worth obfervation, that the more we magnify, by the affiftance of glasses, the works of nature, the more regular and beautiful they appear; whilft it is quite different in respect to those of art: for when they are eaxmined through a microscope, we are astonished to find them so coarse, fo rough and uneven, although they have been

done with all imaginable care by the best workmen. Thus God has impressed, even on the smallest atom, an image of his infinity. The most fubtile body is a world, in which millions of parts are met together, and arranged in the most perfect order. What astonishing wisdom is that which, in the little as well as the great, can operate with fo much regularity and perfection! How great that power which could draw out of nothing fuch an infinite multitude of all fort of beings! What does not divine goodness display even in the smallest bodies, since there are none that are vieles, none that are not perfect! O God! how forcibly ought these reflections to make us feel the limits of our understanding! The least worm, the least infect, the least dust, may convince us, that there are a million and, a million of things of which we are ignorant, and cannot explain. Try, O man! to enumerate the parts of which the body of an animalcula is composed, and which is a million of times smaller than a grain of fand. Undertake to decide that degree of fubtility of one of those rays of light, several millions of which can pass through a hole no larger than the eye of a needle. Thou wilt foon be lost in thy ideas, and thou wilt be obliged to acknowledge thy ignorance and thy limited understanding. How canst thou, then, be vain of thy knowledge! How canst thou presume to blame the ways of the Lord, and criticife the

plan he has formed! Canst thou flatter thyself, thou knowest the millionth part of the beings which exist? Is it not here our duty, our glory even, to acknowledge our ignorance, and the infinite greatness of God!

Let us make this use of these meditations; let us only resect on the infinite divisibility of bodies, in order to feel the more forcibly the greatness of God, and our own littleness. This will also give us reason to admire the wisdom of the Creator: for, by means of the infinite subtilty of matter, all the voids are filled up, without interrupting motion, and the universe presents us a scene continually varying.

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OUTWARD CONSTRUCTION OF THE LIMBS

WE judge, in general, no animals worth our attention, but those that are distinguished by their size. The horse, the elephant, the bull, and such creatures, appear to us worth looking at, whilst we distain to cast our eyes on the innumerable swarm of little animals which people the air, the vegetables, and the dust. How many insects do we tread under our seet? How many caterpillars we destroy? How many slies buzz around us, without in the least exciting

our curiofity, and without thinking of any thing but how to kill them when they incommode us? Nothing is more unreasonable than such inattention; for it is certain, that the wisdom and power of our Creator is no less manifest in the construction of a worm, a fnail, &c. than in that of an elephant, a horse, or a lion. The body of most infects is composed of feveral rings, which link one within another, and have a part in all the motions of the animal. The effential character, which diffinguishes infects is, that, properly fpeaking, they have no bones. Even in this circumstance of their formation. much wisdom is shewn. The motions adapted to infects, the manner in which they are obliged to feek food, and particularly the many transformations they go through, could not be fo eafily performed, if, instead of these moveable rings which go to and fro, their bodies were connected and fastened by bones. It is observable in several insects, that they have the power to contract or enlarge their head, to lengthen or to shorten it, to conceal or shew it, just as they please, and as their different fituations require. The mouth of infects is generally provided with a fort of reeth or a trunk. This is necessary, both on account of their food, and the different purfaits they are exposed to. Many infects are blind, but they are made amends by the touch or fome other fenfe. Infects have two fort of eyes. Those which are

smooth and bright, are in small numbers; but the net-work eyes, fike shagreen, and cornea of which is cut faucet ways, are very numerous. There are fometimes thousands of them. Neither of these are moveable, but their number and polition supply that defect. The horns which most insects are furnished with are of great use to them. These fort of horns, by going before the body, and feeling out their way. not only warn the animal of the dangers with which it is threatened, but are a means to discover their proper food .- The legs of infects are either scaly or membranous. Sometimes the fame animal has both these sorts of legs. There are infects which have feveral hundred feet. without going faster than those which have but In regard to this part of the body, there is infinite variety among infects. With what art must the limbs of those be constructed which fasten on smooth and polished surfaces! How elastic must the legs of those be which leap! How strong must those be of the insects which dig the ground !- Two or four wings are placed in the middle of the body. Some are as transparent as a thin gauze; others are scaly and meally; some are without covering: others are enclosed in cases. At the sides, or the extremity of the body, there are orifices, in the form of shoes, that are called prints. They are the organs of respiration. The variety ob-fervable in the construction and form of the

limbs of infects is prodigious: and the lives of many men would not be long enough, to observe and describe the different forms of these little animals. How varied are those of infects which walk, fly, leap, or crawl! And yet, however different their form may be, they are always in the same harmony and perfect proportion. Would it not be the height of extravagance and perverseness not to acknowledge, in all this, the infinite wisdom of the Creator? We are only rational and virtuous, in proportion as we acknowledge God, and adore him in all things. Let us acquit ourselves of these duties. If we fee but an infect, let us study as much as posfible its wonderful construction, in order to be more fensible of the greatness of God.

there is on Live or S. U. G. U. S. T. VII.

Comparison between the Senses of Men and Animals.

ARE there any animals whose senses are more persect than those of man? It is only in particular cases that this question can be answered in the affirmative: for, it may be said of man, that in this respect also he is in general more savoured than the brute creation. It is indeed afferted, that spiders have a siner feeling; the vulture, the bee, and the dog, a much keener

fmell: it is known that by means of this fense the hound follows the tract of the game; and that other dogs are taught to find truffle under ground. The hog also digs it up with his snout. guided by the smell. The stags are supposed to have so quick a hearing, as to perceive the found of bells feveral miles off; and the mole hears better under ground than man who inhabits the furface, and lives in open air. In regard to fight, the eagle and the lynx have greatly the advantage of man. These remarks are certainly true, but if we come to confider animals on the whole, and compare them to man, we are firuck with one great privilege given to mankind over a great number of the brute creation. Man is naturally endowed with five fenfes. and this advantage is not given to half the animals. The zoophites, which form the link between the animal and the vegetable kingdom. have only the fense of feeling. Many have but two fenfes; others have three; and those which have five, are reckoned amongst the most perfect. But even the most perfect of them have not always fenses more exquisite than ours. There are men who have some one fense particularly fine. Indians can judge by their fmell how much alloy is mixed in precious metals, as well as we can by applying the touchstone to it; others, we are told, can discover, at a great distance, the retreats of wild beafts. The inhabitants of the Antilla islands can distinguish by VOL. II.

the fmell, whether a Frenchman or a black has passed by. The savages are, in some measure, compensated for the weakness of their intellectual faculties, by the quickness of their senses. Many people have exercised and improved certain senses to an aftonishing degree, and if mankind were like the animals, without other affiftance besides their senses, to procure food, and to guard them against dangers; if reason were not their furer and better guide, their fenfes, without doubt, would have acquired the highest degree of perfection by exercifing them to advantage. But, in reality, man does not require senses more exquisite than he possesses: reason compensates a hundredfold for some privileges which certain animals appear to have over us. We may even be affured, that, if our fenfes were more keen, it would be very inconvenient. Let us, for example, consider that of hearing. If we had this sense as quick as the fafety of animals requires theirs to be, even the most distant noise, and the stunning din of mixed founds, would continually interrupt our meditations, our repose, and our most noble employments.

Thanks to the infinite wisdom of the Creator, which has so measured the quickness of our senses, that it is enough to enjoy fully the blessings of nature, without disturbing the noblest occupations of human reason. Our senses being limited, is an advantage rather than a loss to us, a persection rather than an impersec-

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tion. Happy the man who allows his reason to govern his senses; and who enjoys all the advantages which must result from a persect harmony between both.

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AUGUST VIII.

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Thunder.

The party of the land of their HE thunder roars, O mortal! who is it that causes this terrible noise? who darteth the lightning from the clouds? Behold! it is the Ruler of the world, it is the hand of the Most High which hurls the thunder-bolt. Nature rests in his hands, he preserves and blesses it: but at his almighty word, the heavens and the earth are confumed in flames. The heavens and the earth are no more. The thunder roars! How dreadful is the stormy sky! The lightning flashes. The thunder-bolt is shot. God directs the thunder, the finner hears and shudders. Scarce does he dare to raise his eyes towards him whose voice seems to threaten. Christian, let not the majefty of God affright thy foul, when he fits in the stormy clouds, and darts his lightning. When the mighty found of thunder terrifies the wicked man, thy God watches over thee and guards thee from all danger. And

though he should deprive thee of life, all his judgments are just: he is thy master, and thou wilt fay unto him, Lord! my foul is at peace; whether I live or die, all my hope is in thee. He who, when the sky is serene, glorifies his God in fongs of joy and gratitude, is calm and easy, when the finner flies at the fight of dark clouds. But where can the finner fly? Can he escape from the Most High? In vain he would hide himself, the lightning pursues him, and reaches even to the darkeft recess. Fly not then, O finner! think not that thou canst hide thyself from the fight of the Creator, who follows thee every where, and can every moment feize thee. When the thunder roars, thou trembleft, and strikest thy breast; when the ftorm ceases, thou again runnest after false pleafures. Sinner, if thou wouldest obtain mercy, bless the Lord for his goodness towards thee. Forget not the vows thou madest in thy anguish and fright: confider that God is not to be mocked. God is merciful and spareth the rebellious, but he does not spare for ever. The Lord is just; and the supreme Judge will call the finner to account. What is the thunder roaring over our heads, in comparison of that folemn day, when we shall hear the found of a form in which the elements themselves will be diffolyed! this and walled man tire Golf watcher over

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AUGUST IX.

CONTEMPLATION OF A MEADOW.

DARK and majestic woods, where the firtree raises its stately head, where the tufted oaks. spread their shade; ye rivers which roll your filver waves through the grey mountains, it is not you I now mean to praise: it is the verdure and the enamel of the fields which are now the objects of my contemplation. How many beauties present themselves to the fight, and how varied are they! Millions of vegetables, millions of living creatures! Some flying from flower to flower, whilst others creep and crawl in the dark labyrinths of the verdant grafs. All these insects, so infinitely varied in form and beauty, find food and happiness here. All inhabit this earth as we do; and, however contemptible they may be in our eyes, they are all perfect in their kind .- How foft the murmur of that limpid stream, which flows amongst the water creffes, clover, and lucerne, whose purple or blue flowers are agitated by its little waves. Its banks are covered with thick grafs intermixed with flowers, which, bending over the water, trace their image in it. Behold that forest of waving herbs. What a mild lustre the

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fun casts on those different shades of green. Those delicate plants, interwoven with the grass, mix their tender foliage; or elfe proudly raife their heads above their companions, and display flowers without perfume; whilst the humble violet grows on barren hills, exhaling its fweets around. Thus one often fees the ufeful virtuous man in poverty, whilst the rich and great are clothed in fumptuous habits, wasting in idleness the bleffings of the earth. Winged infects purfue each other in the grass. Sometimes I lose fight of them in the verdure, and then again I fee a fwarm of them flying in the air, and fporting in the rays of the fun. What is that gaudy flower waving near the brook? How lively its colours! how beautiful! I draw near it, and laugh at my mistake: a buttersty slies off, and leaves the blade of grass which bent under its weight. In another place I perceive an infect clothed in a black cuirafs, and adorned with bright wings. It comes buzzing to rest upon a blue bell, perhaps by the fide of its companion. What other buzzing is this I hear? Why do those flowers so bend their heads? It is a swarm of young bees. They have lightly flown from their distant home, and dispersed over the gardens and fields. They are now gathering sweet nectar from the flowers, in order to carry it to their cells. There is not an idle one amongst them. They fly from flower to flower; and, in feeking their stores, they conceal their velvet

heads in the cup of the flower, or else with labour penetrate into those that are not yet unfolded, and which afterwards incloses the bee. There, on that high clover, is perched a butterfly. He shakes his gaudy wings, he settles the shining feathers which adorn his head, and feems proud of his charms. Beautiful butterfly! make the flower bend, which ferves thee for a throne, and contemplate thy rich dress in the mirror of the water, Then wilt thou refemble a young beauty, admiring herfelf in the glass which reflects her charms. Her cloaths are less beautiful than thy wings, and her thoughts are as light as thine. Behold this little worm playing on the grafs! No refearches of luxury, no human art could imitate the green and gold which cover its wings, wherein all the colours of the rainbow are mixed. O how beautiful is nature! The grafs and flowers grow luxurious; the trees are covered with foliage; the gentle zephyr falutes us; the flocks feek their pasture; the tender bleating lambs skip and rejoice in their existence; millions of points of grass rife up in this field, and to each point hangs a drop of dew. How many primrofes, with their trembling leaves, are here! What harmony in the notes of the nightingale from yonder hill! Every thing expresses joy. Every thing inspires it. It reigns in the hills and dales, in woods and in groves. O how beautiful is nature! Yes, nature is beautiful even in the least

of its productions; and whoever can be infenfible to its charms, because a prey to tumultuous defires, pursues false bleffings, and deprives himself of the purest pleasures. Happy he, whose innocent life passes away in the enjoyment of the beauties of nature! The whole creation fmiles upon him, and joy attends him wherever he goes, and under whatever shade he reposes. Pleafure springs out of every source, exhales from each flower, and refounds in every grove. Happy he who takes pleafure in innocent delights! His mind is ferene as a calm fummer's day. His affections are gentle and pure as the perfume of the flowers around him. Happy he who, in the beauties of nature, traces the Creator, and devotes himself wholly to him! en ele antico esta la la compensión de també da la colocidad de la colocidad de la colocidad de la colocidad d

AUGUST X.

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MISCHIEF OCCASIONED BY ANIMALS.

IT is grievous to see many productions of nature, and often some of the most beautiful of them, liable to be destroyed by animals. Summer can never pass over without perceiving (particularly amongst the vegetables) what mischies is done by the voracity of different sorts of birds, insects, &c. How many trees destroyed, and

fruits confumed by worms and caterpillars! How many things necessary for our sublistence, are we not deprived of by the infatiable sparrow, and the no less ravenous raven! How fad it is to fee a field destroyed by rats and locusts! These, and such like complaints are often made; and some people fancy that certain animals exist only to torment mankind. There is some foundation for these complaints, and experience proves, that there are animals noxious to men, as well as to plants. It cannot be denied that insects cause much mischief. It is easier to exterminate wolves, lions, and other wild beafts, than to extirpate infects when they fwarm over a whole country. At Peru, a fort of ant called chake, is a real plague to the inhabitants. Their lives even would be in danger, if they did not use some precautions to deliver themselves from these dreadful insects. It is well known what caterpillars do to the fruit trees, and mice to the fields. But however real these inconveniencesmay be, they do not anthorife fuch bitter complaints as we allow ourselves to make; complaints in which felf-love has too great a part. We are pleafed at observing, that the creatures hurtful to us, deftroy one another. We think we have a right to take away the life of animals, either for our food, or for any other purpofe; but cannot bear that they should take any thing from us. We expect they should serve for our and what salt mirrent Saleson and an about

Subfishence, and will give up nothing to them. In reality, however, have we more right over the life of a gnat, than it has to a drop of our blood! Belides, in complaining of the voracity of animals, we do not confider that this plan of nature is not as difadvantageous as it appears. In order to be convinced of this, we have only to confider the animal kingdom in the whole. Such a species which appear noxious is, however, of real use; and it would be very dangerous to attempt to destroy the race of them. A few years ago fome inhabitants of the English colonies in America, endeavoured to extirpate the jays; or jackdaws, because they fancied that these birds did much mischief to the corn; but in proportion as the number of jays diminished, the people were ftruck with the havock made by an enormous multitude of worms, caterpillars, and particularly the May-bugs. They foon ceased to persecute the jays; and as foon as those multiplied again, they put an end to this plague which had been a confequence of their defiruction. Sometime ago a project was formed in Sweden to destroy the crows; but they were observed in time, not only to fix on corn and plants, but also that they devoured the worms and caterpillars, which destroy the leaves or roots of vegetables. In North America they purfued the sparrow violently; but it happened from thence, that the gnats increased to such a degree in the marshy countries, that they were

obliged to leave a great deal of land uncultivated. Pheafant hunting is fo confiderable in the ifle of Procida, that it occasioned the King of Naples to forbid the use of cats to the inhabitants. At the end of a few years the rats and mice increafed fo much, and did fuch mischief, that this order was abolished. And why should we be fo felfish as to envy creatures the small part of our provisions which they require for food. Could we possibly confume all that nature produces. Shall we want any thing for our support or pleafure, because the birds, the mice, and the infects help us to make use of the bleffings which God grants in fuch profusion, and part of which would be wasted, were not the animals to feed on it. Instead of giving way to unjust complaints, let us rather acknowledge the wisdom of our Creator. Every thing in nature is connected together. No creature is useless, although the use of many is unknown to us. It is enough that they exist; we may be certain that it is for the wifest purposes. -many contrained although the first the south

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AUGUST XI.

VARIETY OF COLOURS.

HEN we confider how dull and melancholy the country would be, and how confused all objects would appear, if they were of one colour only, we must acknowledge the wisdom and goodness of God, who, by variety of shades and colours, meant to increase and vary our pleasures on earth. If he had not designed to place us in an agreeable fituation, why should every place around us be adorned with fuch variety of beautiful painting? The sky, and all the objects feen at a distance are painted in the great style. Splendor and magnificence are their characteristics. Lightness, delicacy, and the minute graces appear in the objects defigned to be feen near, fuch as foliage, birds, flowers, &c.

But from whence proceeds this distinction of colours? Each ray of light appears to be simple; by refraction, it divides into several, and it is from hence that colours arise. A glass of water laid in the sun reslects certain colours on white paper. Angular glass well cut and polished, casts still more lively colours. But we should see the finest rainbow close to us, if we turn a prism towards the sun, or if with this prism (or triangular glass) we receive a ray, entering

by a little hole into a close that room. The colours are in proportion more or less bright, according as the refraction of rays is more or less ftrong. The most refrangible ray is the violet. and confequently it is the weakest. Afterwards comes lower the indigo, blue, green, yellow, orange, and red, which of all the rays is least refrangible. The nature also of the coloured bodies contributes to the variety of colours. The smallest parts in almost all bodies are transparent. This is the cause of their breaking, absorbing, or reflecting rays, sometimes one way and fometimes another, as the angular glaffes do. What shews besides, that colours are not inherent in coloured bodies is, that the neck and feathers of a pigeon or peacock, and even the stuffs called changeable, taffeties, filks, &c. all change colour according to their position. This may make us comprehend from whence proceeds the variety of colours. The whole is comprised in this, that the furface of bodies is composed of extreme fmall flakes, which, according to their different thicknesses, restect some coloured rays, while they admit or abforb others in their pores. Thus, when a body, whose furface is fmooth, reflects and throws out almost all the rays of light, it appears white, and when on the contrary it abforbs them, it is black. Let us in this admire the goodness and wisdom of God. If the rays did not divide, and were not differently coloured, every thing would be alike, and

we could only diftinguish objects by reasoning. and by circumstances of time and place. How tedious and perplexed would it be, if we were every inflant to diftinguish one thing from another by reasoning. Our whole lives would be taken up in studying rather than in acting, and we should be for ever in a state of uncertainty. If there was but one colour in the world, our eyes would foon be tired of this dull uniformity. In the mixture, and the several shades of colours, the ufeful and the beautiful are ever united. As far as our fight can reach, we always discover new charms in the fields, the vallies, and the hills. All contribute to give us pleafure, and ought to excite our gratitude. representation and the contraction of the contracti

AUGUST XII.

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THE BUILDINGS OF THE BEAVERS.

IF a man, who had never heard of the Beavers manner of building, had been shewn some of their edifices, he would certainly have supposed them the work of skilful architects. The whole performance of these amphibious creatures is wonderful. The regularity of the plan, the size, the solidity, and the admirable contrivance of their buildings, must fill every attentive observer with astonishment. The beavers chuse a

place to build on where they can have plenty of provisions, and near a stream, in order to have a refervoir of water to bathe in. They begin by making a dyke or bank, which keeps the water on a level with the first floor of their house. This bank is fometimes a prodigious work. It is about ten or twelve feet thick at bottom. It goes floping and infenfibly diminishing towards the top, till it becomes no more than two feet. The only materials for this dyke are wood and clay. The beavers cut pieces of wood, as thick as an arm, with wonderful eafe. They fix these upright into the ground, very close to each other, and interweave between, smaller and more supple pieces of wood. But, as the water would get through, and their watering place would be empty, they have recourse to clay or potters earth which they know where to find, and with which they fill all the spaces within and without, so that the water cannot run through. In proportion as the water rifes, they continue to raife the dyke. The bank of the watering-place being finished, they labour at their houses, which are round or oval buildings, divided into three stories raised one above another: one of them is below the dyke, and generally full of water; the other two are above it. They fix these little buldings in a very strong and firm manner on the edge of their watering place, and always by stories, in order to mount higher, in case the water should rife. If they find a little island

near the water place, they build their house upon it, which is then more folid, and they are less incommoded by water, in which they cannot long remain. If they do not find this convenience, they, with the help of their teeth, put piles or stakes into the ground, in order to support the building, and preserve it from the wind and water. They make two doors at bottom to go out into the water. One leads them to their bathing place: the other is a passage to the place where they carry all the dirt, &c. from their upper apartments. They have a third door higher up, for fear of being taken when the ice stops up the lower doors. They fometimes build their houses entirely on dry ground, and make ditches five or fix feet deep to get to the water. They use the same industry, and the same materials, for the buildings as for the dykes. The walls are prependicular, and two feet thick. They cut off with their teeth the ends of wood which go beyond the level of the wall; then, mixing clay with dry herbs, they make a composition of it, with which they plaister both infide and outfide of the work, by the help of their tail. The infide of the house is arched: and the fize is in proportion to the number of inhabitants. Twelve feet long, by eight or ten wide, ferves for eight or ten beavers. If the number is greater, they enlarge the building in proportion. The instruments the beavers employ, are four strong and sharp teeth; two forefeet, with membranes, or webbed; and a tail covered with scales, formed like an oblong trowel. With these sew utensils, they shame our masons and carpenters, provided as they are with trowels, squares, and hatchets. With their teeth they cut all the wood they require for building; they make use of their fore-feet to dig the ground, and to soften and mix the clay; their tail supplies the place of a wheel-barrow to carry their mortar or clay, and afterwards serves as a trowel to plaister it on.

The works of the beaver have the greatest resemblance to those of man; and, if we were to judge by the first impression they make upon us, we should think them rational, and acting from reflection. But, if we examine closely. we shall find the contrary, and that these animals are only led by instinct. If they were capable of reflecting, they would build differently now from what they did formerly; they would continually improve: but they have always followed the same method, and have never gone out of the line nature prescribed them. Thus the beavers now build exactly the fame houses they built before the deluge. But this does not render them unworthy of our attention and admiration, as, of all animals we know, they come the nearest to human reason. We need only observe them, to be convinced that beafts are not mere machines, but that all their actions and motions are directed by a higher principle. Yet,

what infinite difference has the Creator placed between them, in their faculties! How much fuperior is the inftinct of the beaver to that of the sheep? and what divine wisdom is shewn in these degrees, by which the brute creation insensibly draw near to man! May we profit by the discoveries made of the different faculties of animals, and may we make use of it, by more and more improving our knowledge and love of the Creator.

AUGUST XIII.

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Animals considered as Examples to Mankind of Vices and Virtues.

THE study of animated nature surnishes us with many pleasing idéas; especially, as it gives us every where proofs of the divine wisdom and goodness: but I do not know whether we attend as much as we ought to the lessons of morality it seems intended to convey. Had man continued in a state of innocence, he must still (I should suppose) have been capable of improvement. Life would have been to him a state not only of trial, but of instruction; and it is natural to believe, that the animals which it pleased his Creator to bring before him (that seeing their different dispositions he might learn to call

them by fuitable names) were intended to be his. instructors, as to the difference between good and evil, which in himself he would not have experienced, if he had never finned. If from the apparent fufferings of fome animals, and the feeming cruelty, tyranny, and oppression exercifed by others; and from the various exertions of the tender as well as of the violent passions, which we may observe in the brute creation, man were to learn to hate the one and love the other; a reason why things are so (at least with regard to ourselves) must be allowed. Man, exempt from pain and mifery, could not have known the value of that happiness he enjoved; nor could he, without some knowledge of evil, have experienced the pleasing sensations arifing from freedom, from gratitude, and from compassion. It is remarkable, that compassion belongs to man alone. It is spoken of God in a metaphorical sense; for we cannot suppose the Deity to suffer with his creatures, as we do for each other. In God is mercy, mercy free and infinite: in man, compassion for all created beings. In the brute creation some few instances of affection are found, but no compassion properly fo called; no free difinterested pity. - Some virtues the brute creatures, especially the domestic animals, may teach us; and doubtless they were intended to do fo. The innocent lamb, in a language more powerful than words, instructs us to practife the gentle meek arts of

persuasion. The obedient ox and cow inculcate mild fubmission. The ass is an example of patience; the generous horse of activity, and aptness to receive instruction. The goat teaches us to value liberty. The dog is an example of fidelity and kind attention; the cat of various domestic virtues .- Friendship seems unknown, or but faintly expressed amongst animals, excepting dogs and horses; and in them it is chiefly towards man. Nor is conjugal affection observed, except in the feathered race, among whom the common dunghill cock is diffinguished by his preference of his wives to himfelf, in the circumstance of food: also the singing birds in their attendance on the hen, whose cares the cock shares, or at least endeavours to alleviate. But the thining quality in animals is parental affection, at least in the female sex. The vices which the dumb animals teach us to avoid are much greater and more in number than their virtues. The gluttony, floth, and filth of the hog we detest. The dog, when fawning on his oppreffor, is an object of contempt. The camel, though useful, feems framed for flavery. The pride and ill-nature of the peacock we diflike, as much as his voice. The turkey is a pattern of all the vices in man; and is an exception, as well as the hog, to the moral character of the domestic beafts and birds. The elephant is in many things admirable: but his base concurrence toward enflaving his fellows, his fubmit-

ting to be the executioner of tyranny in destroying criminals, and his mad rage on many occafions, cancel all his pretences to reason. Though what is here mentioned may be ftyled common-place, yet fo long as mankind are inattentive; fuch things may properly be pointed out, and much more might be faid. The beaver, if contrasted with the horrible creature called the glutton, the bee with the wasp, the ant with the flesh-fly, would teach us, as well as the domestic animals, to do good and avoid evil. But the subject is almost inexhaustible. I will therefore conclude with a part of the creation more numerous, perhaps, than all the reft put together; I mean the fish, both those with scales, and those which have shells, but all of the oviparous kind; for the viviparous are like the quadrupeds as to their moral endowments. They feem to travel in vaft bodies, not from any love of fociety, but merely because they are born in the fame or in neighbouring fituations, and live on the fame food, which they find near the coasts, where they themselves are to feed us. They are driven in by the large fish which prey upon them, but which they feem neither to fear nor to hate. Conjugal and parental love do not exist among them any more than friendship or compassion. Vanity, pride, envy, or hatred they are strangers to. If any passion, beyond an appetite for food, exists among these, or the various kinds of shell-fish, it can only be conjec-

tured from the circumstance of lobsters sometimes wanting a claw, from which we suppose they fight; but it may not be fo. Fish want no affistance from man; nor do they by their actions call for it; nor have they any found, as we know of, whereby to express forrow or joy. Appetite for food will tame a carp, and it once produced a learned fish: but these are the only proofs of any capacity for improvement. Perhaps the lively motions of the small fry, and of the golden fish, which give us an idea of joy, are merely owing to their eagerness for prey. Fish then, feem to be absolutely void of reason. Removed from the fight of man, they can only instruct the attentive, inquisitive mind. Such they may teach to despise a state of mute insensibility, and to be thankful for the pleafing fenfations man enjoys from a due exertion of his passions. and for that religion which teaches him to know how to govern them. It may also check the pride of man to reflect, that so large a portion of animated nature as that which the waters contain, is made wholly independent of him as to food and enjoyment; and that when degenerated into a favage state, he is himself reduced to feek a maintenance from them: the last refource of a kind Providence to supply the wants and mifery which floth and inattention have brought upon the human race. "apprehis to took, entite daming their of their te

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AUGUST XIV.

NATURE SEEN AND CONSIDERED IN DIFFER-ENT POINTS OF VIEW.

HE works of nature, fo superior in every way to those of art, are particularly distinguished by that admirable variety, which continually affords us new fources of pleasure and surprise. We look once or twice at a work of art, and if we do return to it again, we at last grow tired, and fee it with perfect indifference. But when we attentively examine and reflect on the works of nature, we are never tired of them. They fill our minds ever with new delight; and we are lost in contemplation. Let us first consider nature in its most sublime point of view. With what aftonishment shall we not be struck, in beholding the immensity of the heavens, the inconceivable number of stars, and the vast extent of the fea. Compared to thefe, how fmall and trifling must appear all works of art, however great and excellent they may be ! All that God creates or does is stamped with a greatness which furpasses all our ideas or conception. To give us an idea of his infinity, he had only to form the starry sky. This displays the magnificent greatness of the Creator, more than all that the earth contains. Is there any thing so adapted to inspire us with the profoundest veneration as

the contemplation of these great works! With what awe, what religious dread, ought we not to be infpired on beholding these great phenomena of nature which no mortal could produce, earthquakes, volcanoes, inundations, storms, and tempests! These great scenes of nature are fometimes before us; and there are none of them which ought not to make us feel the maiefly and greatness of the Creator of heaven and earth. Nature also presents itself in the pleasing point of view. We behold vallies adorned with verdure and beautiful flowers, fields promiting rich harvests, hills covered with trees, vines, all forts of fimples and falutary plants. In all those cheerful scenes, God appears as the friend and benefactor of mankind, who openeth his hand and filleth all things living with plenteoulnels. This is the feason in which all nature furnishes striking proofs of it. Every thing combines to please and flatter our senses, to support and rejoice us. But the time will foon come, when nature will appear under a fad and gloomy form. It will lose much of its beauty and variety. It will resemble a desert which promises neither riches nor pleasure. Each day draws us nearer so that gloomy season; and the insensible decrease of days already warns us, that we must foon confine ourselves to our apartments. But nature ought still to please us even under this form; for the winter also has its share in the perfection of the world, and without it we

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should lose the pleasures of spring and summer. Let us apply all these resections to our own lives: they are equally liable to variation, they change form continually. To the happiest and most cheerful scenes, there often succeeds the most dull and melancholy. Let us therefore, when in prosperity, prepare ourselves for adversity; and let us bless God in every situation of life.

AUGUST XV.

MISCHIEF WHICH RAINS MAY OCCASION.

MODERATE rain always contributes to the fertility and growth of plants; consequently it is an inestimable blessing to the earth. But, in many respects, rain may become hurtful to vegetables, when it falls too heavily, or lasts too long. When it is too violent, it beats delicate plants into the ground; and if it continues too long, it prevents their growth. An excessive wet deprives them of the necessary heat; the circulation of the sap is interrupted; the secretions do not operate properly; the plants languish, and are in danger of perishing. But, though these are the most common ways in which rain becomes hurtful, they are not Vol. II.

the worst. It sometimes makes sad havock, when feveral clouds, drove by impetuous winds. meet towers, mountains, and other high places in their way, they burst, and, all at once, difcharge the water with which they were filled. This is called cataracts. This must necessarily do great mischief; for, water not being compreffible, must, when pressed down, burst suddenly; and flow with great violence from mountains or great heights. It is not wonderful it should sweep away large stones, tear up trees, and throw down buildings, for two causes combine to render its effects more violent: on one hand the great quantity of water which pours down, and on the other the swiftness of its fall, increased by the height from which it falls; the action of a body which moves, being always in proportion to its mass and its velocity. The water-spouts are still more formidable, they are shaped like a pillar or cone, with the point towards the ground, and the base joining to a cloud. These water-spouts attract and draw up every thing they meet in their way; which is dashed down again with the water most violently. If the point of the pyramid touches the fea, the water boils up, foams, and rifes with a terrible noise; but if it falls on ships or buildings; it fliatters and throws the latter down, and very often finks the others. In all probability, this meteor is occasioned by the winds blowing different ways and meeting feveral clouds, which

they drive violently against each other. When these different winds strike the clouds on the fide, they of course occasion their turning round rapidly; and, in this circular motion, they take the form of a whirlwind; and their weight being fuddenly increased by the force of pressure, they fall down impetuously; and in their fall they take the form of a column; fometimes conic. fometimes cylindrical, turning rapidly round about. Their violence is in proportion to the quantity of water which falls altogether; and to the velocity of its fall. Cataracts and waterspouts are always dangerous. Happily the latter are very rare on land; but they are more frequent at sea. As to the cloud cataracts, the mountainous countries are more exposed to them than the flat countries; and they happen fo feldom, that many years pass without an acre of ground being destroyed by them. However this may be, it is very wrong to murmur against God when these disasters happen; or to give way to fears and complaints. Many people are greatly affected by these events: they look upon them as most fatal; and their imagination multiplies and magnifies objects. When a little corner of the earth (which in comparison of our globe is a mere fpeck) happens to be laid waste by a water-spout, or any such accident, we complain as if all nature were in danger of perishing; and, quite full of these local transient evils, we forget the bleffings without number,

which God dispenses over all the earth: and which much exceeds the chaftisement he sends from time to time. If we were just, we should be more femible of the general order and happiness resulting from the present plan of nature, than of the partial evils which are not in the common course of things, and ought only to be confidered as exceptions to the general rule. Would it not be both unjust and ungrateful, to observe only the storms, earthquakes, and inundations which happen possibly but once in feveral years; whilst we forget so many daily bleffings, and those numerous advantages which accrue to us from the constant and regular return of the feafons. Let us rather reflect with humility and admiration on the works of God. and endeavour to form just and proper notions of them. For certainly there is infinite wisdom. order, and goodness in the very things wherein we scarce discover any traces of it; but which will open to us more and more, if we fludy nature with an attentive and religious turn of mind.

AUGUST XVI.

THE CARE OF ANIMALS FOR THEIR YOUNG.

THE most remarkable instinct which God has created in the foul of beafts, is doubtlefs that which they shew in regard to the preservation of their young. There is no animal which forfakes its young, or leaves them to chance. Their felf-love, on the contrary, extends to their posterity, and that with the greatest solicitude, and in the manner most suitable to their different species and different kinds of life. Some of those little creatures, which are hatched from the eggs of fish and infects, do not require to be fat upon, because the warmth of the air in fummer is fumcient, and because they are able to affift themselves as soon as they are born, provided they are in a proper place, and are within reach of food. Few infects live long enough to fee their posterity. Fish and amphibious animals cannot distinguish their young from others of the same species, and yet nature teaches them the best means to provide for the chief wants of new generations. Fish come in shoals to deposit their eggs near the shore, where the water being lower is more warmed by the fun, and where they may be hatched more eafily, and afterwards find food. The amphibious animals come out of the water to lay their eggs in

the fand, exposed to the heat of the fun, as if they knew that their young would discover, of themselves, their true element, and the place where they defigned to live and find their food. Gnats and other infects, which are born in the water, but live either in the earth or air, never fail to lay their eggs where their young ought to be born. The infects, which fly over the earth, and which in general require no longer any food themselves, still take care to deposit their eggs in plants, fruit, flesh, and other things, which ferve as food for their young. There are fome which purfue other animals, in order to infinuate their eggs into their skin, their hair, their mouth, or their entrails.—Some animals lay their eggs in nefts, which they have prepared, and where they beforehand carry all the provifion their young will require. Other animals, which are helpless at their birth, are configned to the care of their parents. How much anxiety the birds have, even before they lay their eggs! Each species has its particular method of building nests. With what affiduity and patience they brood over their eggs for feveral weeks, scarce giving themselves time to eat! What care they take to warm their young, when they are hatched, and to give them proper food! What courage they shew in defending them and fecuring them, at the hazard of their own lives! Is it not also a very fingular instinct in the quadrupeds, to cut with their teeth the navel-string of their young, and to do it with proper precautions, that they may not lose too much blood? With what tenderness and attention they fuckle them, and guard them from all danger! In general, the instinct of animals for the preservation of their young is stronger than the defire of fatisfying their own wants. They fuffer hunger and thirst; they refuse themselves fleep; they even expose their own lives, rather than neglect their little ones. In this instinct, which God has implanted in animals, what admirable wisdom appears! For the preservation of every species depends on the care which the parents take of their young. It is not wonderful that the viviparous animals should be fond of their young: it is their flesh and blood. But, that the oviparous should be so solicitous about their eggs, is to me abfolutely inexplicable. The eggs are quite different in form from the parents, and in every respect are unlike any animal. Befides this, the birds begin to build their nefts before the eggs are visible; and the infects also seek places, where the new generation may find subfishence, before they lay theirs.

Adorable Creator of the world! open our minds, that we may more and more acknowledge the wisdom which shines throughout all thy works.

AUGUST XVII.

SEVERAL SORTS OF EXTRAORDINARY RAIN.

EVERY phenomenon, however natural and useful it may be, is an object of terror and fright to the ignorant and superstitious. We see a proof of it, in those rains which superstition looks upon as supernatural, and which frighten fo many people. Who is it that does not tremble, when he hears of howers of blood? Sometimes, and particularly in fummer, there falls a reddish rain, to which they give that name; or rather, they suppose such has fallen, when, after a common shower, the surface of the water appears red, or that some drops of that colour have fallen on the ground. The people believe it is really blood which falls like rain. If so, it is not wonderful that it should be imputed to supernatural causes. There is nothing in it, however, but what is very natural: for, the atmosphere being filled with different matter, and mixed with many foreign bodies, we must not be surprised that rain should partake of this mixture, and that its colour and qualities should be altered by it. It may easily happen, that coloured particles should fall with the rain. The wind may raife and fcatter about the coloured meal of the flowers, and even the red

excrement of certain butterflies. There are also little red insects on the surface of water. which credulous people may take for blood. Sometimes a certain flimy humour, produced by fat reddish particles which mix in the air, falls with the rain, as it happened in 1764, i. Westphalia and other places. But this is so far from being wonderful, that it would, on the contrary, be extraordinary, if these phenomena did not now and then happen. It is the fame in respect to the showers of brimstone, which are faid to fall frequently. This rain is not brimstone, properly speaking, although it is possible that the atmosphere being full of fulpherous particles, some of them may mix with the rain. But it has been found, from many observations, that these rains are only flowers or coloured feeds of plants, or fmall fand and yellowish dust, which the wind railes and brings from different countries, that mix with the rain. The fupposed flowers of wheat are formed in the same way. When heavy rain falls in places where there grows much fmall celandine, it uncovers their roots which are very flender. The little fcallions which adhere to them, loofen and fcatter about, and is supposed to be wheat fallen from the clouds, which superfitious people believe to be a fign of scarcity and famine. But, from whence come all those caterpillars, with which the gardens and fields are fometimes strewed after rain has fallen? Nothing more

natural than this. The atmosphere containing numberless different forts of matter, it is very probable that insects with their eggs should mix in it. The latter only require a place to hatch in; consequently, when they fall with the rain, they stick to the leaves, and there come to life. The possibility of this is proved by the following fact, related by respectable writers: the rains which fall in Philadelphia, during the month of August, bring with them insects, which, when they stick to men's skins, and are not immediately taken off, bite and cause violent itching. And if these little animals happen to fall on woolen stuff, they six in it, and multiply like moths.

We are not sensible enough of our obligation to naturalists for having, by their enquiries and remarks, removed so many superstitious prejudices. It must however be confessed, that the common people are still full of them, which shews that men in general are more inclined to error than to truth, and that they are not convinced, as they ought to be, of the wisdom and goodness of God's government. Let us not dishonour our reason, and God himself, by such prejudices. Let it be to us a source of consolation and joy, to be more and more convinced that every thing in nature is well ordered, and that God always proposes views infinitely wise.

AUGUST XVIII.

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SENSITIVE PLANTS.

E observe certain motions in plants, which make it doubtful whether they have fenfibility or not. There are vegetables, the flowers and leaves of which, contract and shrink from the touch. We see others, which open and close their flowers at certain fixed hours of the day, fo regularly, as to mark the time very exactly. Others take a fingular form in the night, and fold themselves up. These motions in the plants are the same, whether they are in the open air, or shut up in a close room. Those which always live under water, raife their heads above it in the time of feeding. The movements of a marshy plant, discovered lately in Carolina, are still more fingular: the upperfide, and edge of its round leaves are covered with a number of notches, which are extremely irritable. When an infect chances to creep on this upperside, the leaf folds it up close, and presses it to death; and then opens itself again. We may every day observe certain regular motions in fome of the plants in our gardens. The tulips blow in fine weather, but they close again when it rains, or at fun-fet. Scotch vegetables, fuch as peafe and beans, open their husks when they grow dry, and roll up like chips. Wild oats, when put on a table,

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often move of themselves; particularly if they have been made warm in the hand. Do we not also observe the fun-flower, and several other plants always turned towards the fun? Thefe are undeniable facts, which any body may eafily experience. From thence it was wished to draw a conclusion, that there was some senfibility in plants; and it is true that the abovementioned facts give fome degree of probability to that opinion. But, on the other hand, there has not been any other mark of fenfibility discovered in plants; every thing appears absolutely mechanical in them. We plant a shrub, and we defroy it, without observing any analogy between the animal and it. We obferve a plant shoot, grow, blossom, and turn to feed, as we observe the hand of a watch run over all the points of the dial. The most exact anatomy of a plant, does not discover any organ the least resembling the seat of animal fensibility. When we oppose these observations to those from whence the fensibility of plants may be inferred, we remain in doubt, and know not how to explain the above-mentioned phenomena. Perhaps all we observe in regard to the motions of plants, may only proceed from the construction of some of their fibres, which fometimes contract, and fometimes expand. Perhaps the fubtile exhalations of our bodies cause the fensitive plants to shrink when we touch them. But it may also possibly be, that

all nature being linked, the first degree of senfation may subsist in certain plants; as indeed the step is very narrow between the plant and the muscle shell-sish. Therefore sensibility may perhaps extend even to plants, at least to those nearest to the animal.

Behold how very imperfect our knowledge is on these subjects! All is meer conjecture. We can neither deny, nor politively affert the fenfibility of plants. Let us rest in uncertainty, and not endeavour to pass the bounds prescribed. Let us only give the glory due to our Creator, and be perfuaded, that whatever may be the principal of these phenomena, the plan he has formed in this respect, as in all the rest, must be dictated by unbounded wisdom and goodness. It is not necessary for us to have a fuller knowledge of this matter; and though it remains obscure and problematical, we know enough to fatisfy a reasonable curiosity. Let us endeavour to apply the knowledge we have, without losing time in speculations more curious than useful; and without aiming at understanding what may perhaps be referved for those who come after us, or even for eternity itself.

CONTRACTOR OF THE SECOND

AUGUST XIX.

THE FEAR OF STORMS.

AT a season wherein nature presents to our eves none but pleasing cheerful scenes, there are fome people notwithstanding, who still complain and murmur. Summer, they fay, would still indeed be delightful, if storms did not come to disturb and banish all joy from their souls. The fear of thunder and storms is chiefly owing to the opinion of their being the effects of the wrath of heaven, and ministers of its vengeance. For if, on the contrary, we confidered how much these storms contribute to purify the air from numberless noxious vapours, and to fertilize the earth; if we would take proper precautions against the terrible effects of lightning: the storms would cease to be so dreadful to us. and fenfible people would look upon them as bleffings, more formed to inspire gratitude than terror. But it may be faid, however, and cannot be denied, that thunder-storms often do great mischief. How frequently has lightning struck men and animals, and confumed whole towns and villages? Yet to this we may answer, that here, as in many other cases, terror greatly magnifies the evil and the danger. To fhew how little chance there is of being ftruck by lightning, it is enough to know, that out of feven hundred and fifty thousand persons who died in the space of thirty years in London, there were but two of them killed by lightning. Observe also, that during the greatest claps of thunder most people prolong their fear without reason. Whoever has time to fear the natural confequences of lightning is already out of danger. It is only the lightning which is fatal. When we have feen and not been touch by it, and when the thunder does not come with it immediately, it is doubly foolish to turn pale. or tremble at hearing of a clap, or to stop the ears for fear of a found which is no longer dangerous. What ought to put an end fooner to our fright, or prevent it entirely, is, that after the flash of lightning is over, we may securely wait for the clap of thunder, as it is certainly as harmless as the found of a cannon. The thunder tells us we have escaped the danger, and at the same time informs us at what distance it is: for the greater space of time there is between the clap of thunder and the fash of lightning, the more distant is the storm.

The furest means to guard against fear of thunder, or any other alarming phenomena of nature, is to endeavour to have a good conscience. The righteous man, calm and composed, fears not the judgments of heaven. He knows that at God's commands all nature is armed against finners. But even when the supreme Judge strikes and terrifies the wicked, the good

man knows that he is under the protection of Heaven. " He hears the thunder roar, but he trembles not. His Creator, the God whom he adores, commands the storm. He knows when it is only to terrify, and when it is to firike. He fports with the tempelts and floring. He makes use of them to convince the infidel (who dares doubt it), of his existence, and to give terror to the wicked. It is not for the friends of God to tremble. It is their glory to love and put their trust in him even when his thunder roars. A day will come, when raifed above the stormy regions, they will traverse the clouds by the light of his lightnings." They will then find, that even thunder is a bleffing, which God makes use of in order to purify the air; and they will blefs that great Being, who, shough under an appearance the most dreadful, still vouchfafes to supply the wants of the earth.

AUGUST XX.

Summer furnishes us with Images of Death-

A FEW weeks ago our gardens afforded us cheerful pleafing scenes, where every thing infpired serene delight. But now the prospect becomes daily less agreeable and less varied. Most of the flowers which adorned our gardens

are gone, and a few only remain, which but recal to us the charming scene we enjoyed so early. These revolutions in nature are instructive lessons for us. There is a time of life, in which we have all the charms of fpring; we are admired and loved, and excellent fruit is expected from us. But how often is this expectation disappointed? The blossoms drop off even before they are blown; a fit of fickness robs us of all our charms, and a premature death puts an end to all hopes. We observe that the fpring flowers, which last till summer, wither then, and are gone in a few hours. Aftriking emblem of death! There scarce passes a day in which we do not behold men furprised with sudden death, when they least expect it; one of the many means which God makes use of to draw us to our end. It is true that, from habit, we become almost indifferent to the death of fo many fellow-citizens as are fuddenly cut off. But it is not the less true, that "the days of man are as the grafs of the field. In the morning it is green and groweth up, but in the evening it is cut down, dried up, and withered."

We are now in a feafon when we endeavour to avoid the heat of the fun, and feek the cool shade of the forests. But are not these retreats calculated to make us reslect on the silence and darkness of the grave? It is there that we shall find rest after the satigue and heat of the day. The mower prepares to mow his corn. The feythe cuts down the wheat on every fide, and leaves defert and empty fields behind. This reminds us of our own lot. All flesh is as grafs, and the whole duration of this life, with all its glory, is but as the flower of the field. Man flourishes for a little, and is then cut down. when the great Ruler of the harvest ordains it. The very bees proclaim this truth. When we reflect on the activity and industry with which they gather and prepare their honey, we learn to lay up early treasures of wisdom and virtue, which may be a comfort to us in our old age, and in the hour of death. The farmers will foon unite in gathering the fruits of the earth, to lay them up in their barns. These days of harvest are the most important of the whole year. But how folemn will that great day be. in which the Creator himself will be the reaper! that, in which all the dead shall rife from the grave, and the supreme Judge shall say to his angels, "Gather ye together first the tares, " and bind them in bundles to burn them; but "gather the wheat into my barn!"

These are not the only emblems of death with which nature furnishes us, but they are the strongest. The man who reslects upon them, can only consider them as pictures of the brevity and frailty of life; and there is no danger that such reslections as these should disturb that cheerfulness so natural to us in summer. Meditations on death are the best means of improv-

ing this happy feafon, and making it still more agreeable than it is. When once we look on death in its proper light, far from confidering it as an enemy to pleafure, we acknowledge that the thought ennobles and increases our happiness. Should we run into imprudent excesses in fummer time, if the thought of death was present to us! Should we make an improper use of God's bleffings, if we remembered, that the hour will come wherein we must give an account of our actions? Would the goods of this life corrupt our hearts, if we confidered how fleeting they are? Should we place our first happiness in the enjoyment of the world and its pleafures, if we accustomed ourselves to think, that we should one day enjoy a better world, with purer, nobler, and never-ending pleasures.

AUGUST XXI.

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Causes of the Heat of the Earth.

ONE of the chief causes of the heat of our globe is certainly the sun, and its position relatively to such and such parts of the earth. When the sun is in the south, the days are not so hot towards the north, as when that planet is near the northern pole. The same is observed in

the fouthern parts of the earth, when the fun is turned towards the north. In countries where the fun is generally vertical, the cold is never so great as to freeze the rivers or lakes: on the contrary, the heat is always intenfe. It becomes violent when the fun is long above the horizon; and by that means darts its rays a confiderable time on the same place. This is the reason that, towards the poles, where the days are very long, the heat is fometimes intense in certain countries. When all this is confidered, we must necessarily conclude, that the fun and its polition, with regard to the earth, is one of the chief causes of the heat in the open air. But this is not the only cause, for if it were, all the fummers would be equally cool. The temperature of the air must also be then exactly the fame in all countries fituated in the fame climate. which is not the case. It is observed that, on the highest mountains, where there are spacious plains at top, and upon which there are also other hills. and other plains, it is still much colder than in low lands and deep vallies. Even under the line, if from a plain where the heat is oppressive, we go up a hill 12,000 feet high, we shall find the sharpest cold, we shall find ourselves in the region of fnow and ice. It has also been remarked in winter, that when the cold has been severe in the day time, it has fentibly diminished towards midnight; and the weather becomes temperate, though the rays of the fun do not then warm the atmosphere. It is therefore certain, that there may be a heat in the air which is not immediately produced by the fun. There are certain bodies, which, by friction or percuffion, grow warm and take fire. The axle-trees of wheels take fire when the carriages go too fast, and are not properly greafed. Other substances grow warm, and even inflame, when they meet together. If a certain quantity of water is poured on a bundle of hay or ftraw, it will occasion a considerable degree of heat. Bodies which corrupt or ferment, often acquire a heat perceptible by the thermometer, or merely by the feeling. Even in the air, the motion of certain substances may occasion mixtures, diffolutions, and combinations which produce great heat. Thus then we may account for the production of heat in the air. In the first place, the fun is the principal cause of it: to the heat proceeding from this planet is united that of many living creatures; that of fire produced by wood, coal, and other combustibles; that which comes out of the bowels of the earth, the bottom of the fea, and from mineral and warm fprings. This heat is often much increased by the fermentations which different bodies undergo, whether in the furface of the earth, or in the higher atmosphere, and which occasion hot vapours. When therefore all fort of little particles, fuch as float in the lower atmosphere, and are calculated to receive and retain heat,

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when they grow warm, and are carried away by the wind or rain, and gradually increases, and becomes more and more intense. On the contrary, it abates when any of the above-mentioned causes cease.

All these plans are worthy of the wisdom and goodness of God; they are useful to all the habitable parts of the globe; and he has granted to each climate that degree of happiness it was susceptible of. But we, in particular, who live under a temperate climate, we more sensibly experience his paternal care. Heat and cold are dispensed to us in the wisest proportion; and we should be the most ungrateful of beings, were we not to acknowledge and praise his goodness towards us.

AUGUST XXII.

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VARIETY OF PLANTS.

ONE of the things most worthy our admiration in the vegetable kingdom is the great variety of plants. They are varied in respect to their parts, their production, their properties, and qualities. The manner in which some plants become fruitful is still very obscure. It is little known, for example, how it operates in moss, mushrooms, and fern. There are plants

which shew us fingular monstrosities: there are flowers which have no heads; there are fome. from the middle of which foring out other flowers. Certain plants, called foporiferous, which turn at night differently from what they do in the day. Others turn towards the fun: others shrink and contract when we touch them. There are flowers which open and thut at certain regular hours. Some shoot up, blossom. bear fruit, and drop their leaves sooner than others. Plants differ also, in respect to the places wherein they thrive best. All of them are originally wild; that is to fay, that they grow of themselves, and without culture. The Creator affigned for plants, a climate adapted to their nature and purposes, and where they should arrive at the greatest perfection. But those which are exotic, may be naturalized with us, and made to fucceed very well, provided care is taken to procure for them the degree of heat their nature requires. What particularly charms the eye is the variety of forms in plants. Let the most perfect of them be compared to those which are least so; or let even the different forts of the fame species be compared, and we cannot but admire the aftonishing variety of models from which nature draws the vegetable world. We step with wonder from the truffle to the fensitive plant, from the mushroom to the carnation, from the acorn to the lilac, from the noffech to the rose-tree, from moss to the

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cherry-tree, from the morel to the oak, from the miletoe to the orange-tree, from the ivy to the fir. If we confider the numerous forts of mushrooms, or the kind of plants which we call imperfect, we cannot but admire the fertility of nature in the production of those vegetables, which are so different in form from the others. that we can scarce rank them among plants. If we afterwards rife some steps up the chain of plants, we behold with pleafure the degrees of those with stalks, from the grass which grows between the stones, to that inestimable plant to which we owe our principal food. We, in the next place, observe the variety of creeping plants, from the tender bind-weed to the vine. We cannot too much admire the perfect harmony, as well as the variety of the work of nature. Every plant, from the hylfop which grows on walls, to the cedar of Lebanon, have the same effential parts. A little herb is as complete a plant as the most beautiful rose, and the rose is not less so than the finest oak. All belong to the fame fource; all follow the fame general laws of growth, propagation, and multiplying, and yet each species is distinct from the other. Among fo many millions of plants, there is not one which has not its distinct character, properties, and particular manner of taking nourithment, of growing, and continuing its fpecies. What inexhaustible riches in their colours, forms and proportion! Those are happy, who

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are capable of observing this variety, and of tasting the many different beauties of the vegetable kingdom. What pleasure may not the mind experience in such a study! After having once enjoyed it, we should find so many charms in it, that we should prefer it to all others.

AUGUST XXIIL

REFLECTIONS ON THE ANIMAL CREATION.

E may confider the animal kingdom as a well-governed state, in which there are a proper number of inhabitants, each in the place appointed for them. All have the faculties neceffary for the employments defigned them. They are induced by rewards and punishments to fulfil their destination, and are protected as much as they require from their feveral enemies. In this animal kingdom, the little and the weak which compose the greatest part of it, are subject to the strong and the powerful; but the whole are subject to man, as to the representative of the Deity. Animals find, in every part of the earth, enough to employ them, and enough to feed on. They are accordingly difperfed throughout every where; and their nature, their organs, their feveral constitutions, are all adapted to the different fituations defigned VOL. II.

them. Their employments differ greatly. All tend either to increase their species, to maintain an equal balance between the animal and the vegetable kingdom, to provide proper food, or to defend themselves from their enemies. Let us observe, that every part of their bodies are fuited to their offices, and to the nature of their fouls. The Creator has given them an instinct to compensate for the want of reason. An inflinct varied in a thousand ways, and according to their feveral wants; an inflinct for motion. for food, to enable them to distinguish it with certainty, to find it out, to feize upon it, and to prepare it; instinct to build nests and proper habitations, to lay in provisions, to transform themselves; instinct for the increase of their kind; instinct to defend and secure themselves, &c. In each class of animals there are some which live on prey, and individuals which fuperabound in other classes. Each species has its particular enemies, which keep up the proper balance, and prevent any from multiplying too much. The fick animals, or those that have any defect, are generally the first which ferve as food for others. The fruit and the carcasses which corrupt are eaten up, the earth is not incommoded by them, nor the air infected. Thus nature preserves its beauty, freshness and purity. The beafts of prey have a make conformable to their defign. They are endowed either with peculiar strength, agility, industry, or address. But in order to prevent them from destroying whole species, they are confined within certain limits. They do not multiply fo fast as other animals, and they often destroy one another, or their young are food for other creatures. Some fleep during winter, digest slowly, and feed on fruits of the earth for want of other food. The weaker animals are provided with defence in proportion to their fituation, and the dangers to which they are exposed. Their natural arms, their swiftness, their habitations, their scales or shells, their cunning preserve them from destruction; and by these means the proper balance is always kept up, as to the number in every species of the brute creation. Animals are in some measure conftrained to acquit themselves of the part affigned them, because their happiness depends upon it. They find their well-being in following the laws prescribed by nature; as, on the contrary, they could not transgress them without drawing all forts of evil upon themselves. The animals which give milk are the largest, and consequently the least numerous, but they fulfil very important offices. Those of birds also are various. They eat the superfluous seeds, they devour carcales, they diminish the number of every fort of insect. Most amphibious creatures prey on other animals. The fmallest animals are the most numerous, and in proportion, more voracious than the larger. They make many

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vegetables fruitful, and ferve for other ufeful purpofes. All we behold fo admirable in the animal kingdom proves the existence of a Being who possesses the highest degree of wisdom and knowledge. Who but he could have peopled this immense globe with so many different species of living creatures, providing for them every thing necessary? Who but he could give food to fuch infinite multitudes of creatures according to their different taftes, and find them cloathing, habitations, and whatever they require to guard and defend themselves with so much address and fagacity, fo many instincts, and such industry? Who but he could have kept up the equal balance between fo many different species and classes of animals? Who but he could appoint for each living creature the element fuited to it? or form that amazing number of limbs. joints, bones, muscles, and nerves joined together, and placed with fo much art, harmony, and perfection, that each animal can perform its feveral motions, in the manner most convenient and best adapted to its way of life, and the different fituations it is in?

O Lord God Almighty! it is thou only who couldn't do fuch things, and to thee belongeth

all glory, praise, and thanksgiving.

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A U G U S T XXIV 19 The water

Division of the Earth. Heat

Even at this time their countries in ALL the known countries of the earth are divided into four principal parts. Europe, Afia, Africa, and America. Europe is the smallest, for it is about 900 German miles in length, and 1500 wide. The Europeans, however, possess countries in the three other parts of the world; and have fubdued near half the earth. None but the Europeans travel into the four quarters of the globe, to carry home the produce of all the different countries; nor are there any people fo well informed as they are, or who cultivate the arts and sciences with more success. Europe is the only part of the earth which is every where cultivated and covered with towns and villages. The only place where the inhabitants keep up a constant intercourse, and profess nearly the same religion. The three other parts are inhabited by a multitude of different nations, which have no connection with one another; who are scarce acquainted, and who differ greatly in their manners, way of living, and in their religion .- Afia is the largest known continent: it is between 1500 and 2000 German leagues long, and 1200 wide. As the countries that are in the interior of this part of the world do not enjoy the cool fea breezes

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as they are not watered by many rivers, as they have vast plains and barren mountains, the heat and cold are in the extreme. The earth is unfruitful, and confequently never well cultivated. Even at this time those countries are only inhabited by people, who in the morning pull down their towns and villages to carry them fome miles farther, and build them up again at night in an hour. It feems as if nature had made this wandering and unfettled life necessary; and intended, that the establishment, laws, and government of these people should be less durable, and more fubject to change than elfewhere. The other people of Asia often suffer greatly from the restless and unquiet character of these wandering nations. The northern parts, which are full of lakes, marshes, and forests, have never been regularly inhabited; but the fouthern, eaftern, and western countries are the finest in the world, particularly those situated in the fouth. They are wonderfully fertile, and produce the necessaries of life in great abundance. -Next to Afia, Africa is the largest part of our hemisphere. It is a thousand leagues square. As it is under the torrid zone, there are immense fandy deserts; mountains of prodigious height; forests burnt up; and monsters of every fort there. The oppressive heat enervates and weakens every faculty of the foul. Confequently the flates are in general ill governed there. The innermost part of Africa is still

almost unknown: though that quarter of the world is the nearest to Europe.-America was not discovered by the Europeans till within some centuries. It is divided into two continents, separated only by a very narrow ishmus, or neck of land; and furrounded by a great many islands. The cold climate of the northern part, its few productions, and its distance from inhabited countries, prevent its being entirely known as yet; but we have every reason to believe, that the natives are uncivilized. The earth there is still covered with forests and marshes; and hitherto the Europeans have only cultivated the eaftern coafts. In the fouth of America there were formerly fome great nations. The remainder was inhabited by favages. It is the country for ferpents, reptiles, and infects, which are much larger than in Europe. It may be faid, on the whole, that America is the country of greatest extent, but with the fewest inhabitants.

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ned Hill If we reckon the number of leagues these four parts of the globe occupy, their fize will appear very considerable; and yet all the known countries make but a fourth part of this earth. And what is our world in comparison with those immense bodies in which God has placed in the simmenst! It is lost in the numberless multitude of celestial globes, like a grain of sand in a great mountain.

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AUGUST XXV.

THE NATURE AND PROPERTIES OF LIGHT.

WE every moment experience the use of light, but we cannot with certainty decide the nature of it. All that has been faid on the fubject, by the greatest philosophers, is no more than conjecture. Perhaps light is only a fluid fubstance, by which we are furrounded, and which may only require, in order to be perceptible, the being put in motion by the fun or fome other fiery body: or perhaps, it is the fire itfelf which, by the infinitely fubtile particles issuing from it, gently strikes our eyes at a certain distance. The first of these hypotheses has been adopted by the most famous naturalists. It is certain at least, that there is a great difference between fire and light. The latter is beyond all comparison more subtile than fire. It penetrates glass and other transparent bodies in a moment, whereas fire does it very flowly. The pores of glass, consequently, must be large. enough for the light to pass through them easily while the fire meets more resistance, because it is less subtile. It is observable, that fire moves much flower than light. Let burning coals be put into a room, and the heat will fpread but flowly, and the air will only grow warm by de-

grees; but, as foon as a lighted candle is brought into a room, it is fuddenly lighted by it, and feen wherever its rays can reach. From thefe and some other facts, we conclude that fire and light are different substances, though we generally fee them both together, and though one may be occasioned by the other. But we may very possibly draw some false consequences from hence. The properties and effects of light are not less incomprehensible than its nature. The rapidity with which it accumulates is prodigious. If its swiftness was not greater than that of found, it would take up seventeen years to come from the fun to us, but it only requires from feven to eight minutes to do for In that short time a ray of the fun darts over many millions of leagues, and in a fecond it goes over twenty thousand. Now, as found reaches only 1070 feet in a fecond, a globule of light must be 590,000 times more fabrile than a particle of air, although the latter is not visible to the naked eye, nor even with the best magnifying glasses. Befides, the observations of astronomers inform us, that the rays of a fixed star, in order to reach us, must go farther than a cannon ball shot with the greatest force could go, in the fpace of 104,000 millions of years. The extent or expansion of light is not less inconceivable. The fpace in which it spreads has no limits, but the universe itself, the immensity of which exceeds the capacity of the human understanding, Thi

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almost boundless extent is the cause of the most distant objects (for example the heavenly bodies) being discernible with the help of telescopes, or even by the naked eye. And, if we had optical instruments, which could extend our fight as far as the light can spread itself, we should be enabled to fee bodies in the most distant extremities of the univerfe. It is certain, that our understandings are too limited to investigate the defigns of God; in respect to the nature of and properties of light. But it is no less true, that we might explain many things if we give proper attention to them. Why, for example, does light foread on all fides with fuch prodigious swiftness, if it not in order that an infinite number of objects should be seen at the same time by a vast number of people? Do not the rays dart to rapidly, for the purpole of discovering to us quickly, even the most distant objects? If the increase of rays acted more slowly, there would result from thence great inconvenience; the light would not be near fo ftrong or bright, the rays would not penetrate fo well, and the darkness would be dissipated but slowly and with difficulty. Why are the particles of light fo wonderfully subtile, if it were not in order to paint even the most minute objects to the eye? Why is there not more dentity in these particles. Why are they not fo thin, if it is not to prevent them from dazzling us with their brightness, on hurting us by their heat?

Why are the rays refracted in so many ways, if it is not to make objects more distinguishable to us?

Thus, the Creator ever has in view the benefit and happiness of his creatures. If he had not created light, how many sources of enjoyment should we be deprived of! And how narrow would the limits be of our knowledge and our occupations!

AUGUST XXVI.

THE FORMATION OF BIRDS.

BIRDS may undoubtedly be ranked amongst the most beautiful creatures in the world. The form of their bodies is so regular and perfect, that it is enough to convince us of the wisdom of the Creator. They, as well as those animals who give milk, have bones; but they are very differently clothed. Their bodies are covered with feathers fastened into the skin; laid one over another in regular order; and surnished with a soft and warm down. The large feathers are covered again over and under with smaller feathers. Each feather has a quil with beards. The quil is hollow at bottom, and from thence the feather receives its nourishment. Towards the top it is sull of a fort of marrow.

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The beards are a range of little thin flat flakes, pressed close to one another on both fides. Inflead of the forelegs of the quadruped, the birds have two wings. They are composed of eleven bones, into which are fet the feathers intended for flight. These feathers turned back, from a fort of arch, strengthened still more by two rows of smaller feathers, which cover over the root of the large ones. The mechanism of the wings is truly admirable: they do not strike behind like the fins of fish, but they act prependicularly against the air; which is under them, and which affifts the flight of the bird greatly. The wings are a little hollow, in order to collect more air; and yet they are fo close, that no air can penetrate through them. The body is fulpended between the two wings in a perfect balance; and in the manner best adapted for the feveral motions it is to perform. The heads of birds are small, that the weight may not retard the vibration of the wings; and to be more proper to cut the air, and make their way through that element. The principal use of the tail is to sapply the place of a rudder; but it particularly ferves to preferve the balance in flying, and to affift the bird in rifing into the air, and descending again. The legs (never more than two) are generally fo placed, as to keep the body in the centre of gravity. Some birds have them more behind, and can only make use of them in swimming. The legs are composed

of the thigh, of the leg properly speaking, and the claws. The thighs are covered with muscles, and almost always with feathers. As for the legs, they are thin and generally without feathers. Most birds have four toes; three of which are before, and one behind. At the end of the toes they have nails; which they make use of either to perch, or to seize their prey, and to take up their food. Some birds feed on animals of different fizes, others on plants, and particularly on the fruit and feeds of plants. Those which live on seeds, steep and fosten them in their crop; from whence their can pass but little food at a time into the stomach, because in this fort of bird is but small. Their stomache are composed of very strong muscles, by means of which the food is fo much the better bruifed and ground, as those birds generally swallow fand, and little hard sharp stones to affist digeftion. Birds of prey, have much weaker stomachs, but they also have recourse to stones to facilitate its functions. One must have lost their reason, not to trace the wisdom and providence of God in the formation of birds. Their bodies are formed throughout the whole, with fuch art and harmony, as to be perfectly adapted to their way of life, and their different wants, The flork and the heron, which must feek their food chiefly in marshes, have long bills; and are raifed high, that they may run into the water without wetting themselves, and get very

far in to reach their prey. The vulture and eagle, who live only by rapine, are provided with great wings, strong claws, and sharp bills; which are necessary to keep them from starving. The fwallow's bill is small and pointed : the mouth large and cut up to the eyes; on one hand not to mis the insects they meet flying; and on the other that they may pierce through them. more eafily. The fwan has in its windpipe, a particular refervoir, from whence it draws air enough to breathe when it puts its head and neck under water to feek food. Several little birds, which flutter and hop among the thick bushes, have a pellicle on their eyes to guard them. In a word, the formation of each is wonderfully adapted to its way of life. Each species is perfect in its kind; and no limb is useless, superfluous, or deformed. The wisdom observable in this will appear still more extraordinary, if we confider that every part of a bird, at the same time as it is fuited to their uses, also combines to adorn and give them the most beautiful form. What wonderful difference of conflruction, proportion, colour and voice do we not observe between the raven and the swallow. the partridge and the vulture, the wren and the offrich, the owl and the peacock, the crow and the nightingale? All these birds are beautiful and regular in their kind; but each has its peculiar beauty and regularity.

Thus may the fight of birds become useful to us, if we accustom ourselves to trace them up to the God that created them. Happy for us if we make this use of his creatures. What pleasing employment may not such restections afford!

AUGUST XXVII.

REFLECTIONS ON THE SKY.

E need only cast our eyes on the sky to be struck with admiration at the fight of this magnificent work of the Creator. With what luftre this rich canopy shines over our heads, particularly in the night, when millions of stars appear, and when the moon sheds its mild light from far! Who can raise their eyes, and contemplate this beautiful scene without astonishment, without the sweetest emotion! But we discover still greater wonders when with the mind's eye we traverse that immense space, and make it the Where are the bounds to subject of reflection. this space? Where the beginning or the end of it? Globes without number, and of a prodigious fize, rise there, one above another, and the human mind that would attempt to follow them in their rapid courfes, would foon discover its weakness. A pure etherial air, infinitely sub-

tile, fills that space, supports those prodigious bodies, and traces for them the circles in which they continually run. There are no props or pillars to support this immense vault and the enormous burdens with which it is loaded. It is not fuspended or fastened to any thing, and yet it has supported itself for millions of years, and will continue to do fo for ever. What a number and how great the fize of those celestial bodies with which the fky is filled! The fize of the fun, and of many of the planets moving round it, much exceeds that of our earth. And who knows how many there are of the other flars which may be still more confiderable? Their prodigious distance makes them only appear to us little lights sparkling in the fky. But in reality they are fo many funs, the immense circumference of which cannot be measured. With the naked eye we behold innumerable celeftial bodies, when the absence of the fun in the night permits us to fee them shine. How many more do we discover with telescopes! It is also probable, that there are many out of the reach of our best glasses. We may venture to affert, that many millions of funs and worlds roll in the firmament, and that our folar fystem is but the fmallest part of that great multitude ranged above us in fuch beautiful order. All this must naturally fill us with admiration. Those bodies are in a perpetual motion, which is fubject to invariable laws. They all turn round

their own axis, and most of them also run immense courses round other globes. Que particular path is appointed for each of them, from whence they never deviate. They run their courfe with a swiftness which passes all imagination. They have a force by which they fly from their centre, and yet an equal force retains them within their orbit. Though fo many millions of bodies move in the same space, they never interfere with one another. Those stars which appear to us confusedly spread in the firmament are, on the contrary, placed in the greatest order and the most perfect harmony. They have rifen and fet regularly in the same manner these millions of years, and astronomers can foretel exactly their position and course. What new subjects of admiration we should have, if we were better acquainted with those innumerable globes! But we know little except the fystem of which our earth makes a part, and of which the fun is in a manner the chief or centre.

Who can look up and contemplate the sky without being struck with assonishment at the thought of that great Being who framed such magnificent works? Let our admiration lead us to humble ourselves, and to adore him.

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A.UGUST XXVIII.

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Moral Reflections on seeing a Field of Corn.

HIS field was lately exposed to great danger. Impetuous winds whiftled round it, and the storms often threatened to beat down and destroy the wheat. However, Providence has preserved it hitherto. It is thus that the storms of affliction often threaten to overwhelm us. But this very tempest is necessary: it purifies and roots out the tares of vice. In the midst of trouble and forrow, our knowledge, faith, and humility, increase and strengthen. It is true that, like the weak ear of corn, we fometimes bend and are bowed down to the ground; but the merciful hand of our Father supports and raises us up again. Towards harvest time, the corn ripens fast. The dew, the heat of the fun, and the rain all combine to haften it. Oh! may we, from day to day, grow ripe for heaven. May all the events of our lives lead to that falutary end. Whatever be our fituation here; whether the fun shines upon us, or is wrapt up in clouds; whether our days be gloomy or ferene; no matter, provided all concur to increase our piety, and dispose us better for eternity. It is very remarkable, that the ears of corn loaded

with grain differ confiderably in height from those that are poor and thin. The latter are ppright, rife high, and overlook the whole field, whereas the others bend under their own weight. Behold the emblem of two forts of men! The vain and prefumptuous, who have but little religion, fet themselves above others, and look with contempt on the truly righteous. A foolish prefumption blinds them, and makes them despise the means of salvation. Those, on the contrary, who are rich in virtue and good works, humbly bend down like the well filled ears of corn. All the feed which is to be reaped is not equally good. How many tares and weeds are mixed with the corn! Such is the fituation of a man in this world. There is always a mixture in him of good and bad qualities, and his corrupted nature, like the tares, often interrupts the progress of virtue. A field of corn is not only the image of one individual, but also of the world in general. The profane and the wicked often, by their bad example, fow tares in a field where there ought to be none but good feed. The great Lord of the field permits the tares to remain fome time. He tries patience and forbearance; and it will not be till the time of harvest, in the great day of retribution, that he will give free course to his justice. Behold with what eagerness the country people run to gather the fruits of the earth! The fcythe cuts all before them. Thus death fweeps all away, the high and the

low, the faint and the finner. But, what are those cries in the fields? They are shouts of joy at the fight of a plentiful harvest. But how joy-ful shall we be in the great day of harvest! With what inessable sentiments will our hearts overslow, if we meet in the blessed society of angels! May this sweet hope support us in the time of trouble, and make us wait with patience for the day of harvest.

AUGUST XXIX.

SHELL-FISH.

HE shell-fish or testaceous animals are numerous. They live in houses of a substance more or less chalky, which may be confidered: as their bones. These shells are either single, that is to fay in one piece; bivalves, or multivalves, that is to fay, composed of two or more pieces. The testaceous animals form two large families; the muscle, the shell of which is in feveral pieces, and the fnail whose shell is in one piece only, and generally spiral. The construction of the former is much more simple than that of the latter. The muscles have neither head, horns, nor jaws; there can only be di-Ringuished in them a windpipe, a mouth, and fometimes a fort of claw. Most fnails, on the contrary, have a head, horns, eyes, a mouth,

and a claw. There is great difference among the shell-fish: some are oviparous, others viviparous. The testaceous are born with their shell upon them; but in proportion as the animal grows, its house, the inner partition of which is lined with a very fine membrane, grows alfo; not only in thickness by layers or leaves one over another, but in circumference, as the circumvolutions or fpires multiply more and more. The shells are formed by means of a flimy liquor, which is produced by the perspiration of the animal; and which gradually thickens and grows hard. But whether the shells grow by an exterior juxtapolition, or by a common inward nourishment, is not certainly determined. It is more probable, that it is by the former means. Most shell-fish live in water. and particularly in the fea; fometimes near the shore, and sometimes in the main ocean. Some are carnivorous; others feed on plants. Some keep at the bottom of the fea, or adhere to rocks, and remain motionless. Oysters, and other animals with hard shells, fasten themselves to different bodies, and flick to them by means of a fort of glue or chalky liquor; and are often heaped and fastened one upon another. This adhesion is voluntary in some shell-fish, who cling to any thing, according as circumflances oblige them to it; but it is voluntary in others, which always remain motionless on the rocks, to which they are fastened. The know-

ledge we have of these animals is still very imperfect. As they mostly live in the bottom of the water, it is very difficult to make exact obfervations on their formation, their feeding, their motions, &c. There are only three or four different classes of shell-fish yet known, but it is very probable, that a hundred more would be discovered, if it were possible to search into the bottom of the fea, or into rivers. Hitherto we have fcarce attended to any thing but the beautiful forms and colours of the shells, while the true confiruction and way of life of the animals that live in them are still little known to us, nor do we know fcarce the purpose of their existence. But we need only look into the cabinets of shells that are collected, and there observe the prodigious variety in their fize, their form, their richness and beauty of their colours, to prove that the hand of God vifibly shews itself; and that all his designs are worthy of his wildom.

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AUGUST XXX.

On the Government of God.

commented the Contract sales to the A GOD, who from his Supreme height could be an indifferent spectator of all the revolutions which happen in this world, would not merit our homage. Happily for us, the government of the God whom we adore, takes in all his creatures. We every where find the centre of his empire, but we no where fee its bounds. All his works are continually before him. one glance he beholds the past, the present, and the future, and comprehends all the combinations and relations between them. The least events, the smallest circumstances, nothing escapes him; every thing together enters into the plan he has laid down to compass the infinitely wife and gracious purposes he formed. And these purposes unite and combine to procure for his creatures the highest possible degree of happiness. God takes pleasure in his works; he fees them with one glance, and rules them by a fingle act of his will. His laws are dictated by wisdom, and his commands are a source of joy and happiness. God by his providence preserves every species of creatures formed from the beginning of the world. Animals die, and others come in their place. Generations of them pals

away, and others fucceed. The Ruler of the world makes use of inanimate creatures to preferve the living, and to make them happy. Laftly, he makes them all subject to man, who alone is capable here of knowing his works, and of adoring him. This God, who is goodness itfelf, expects that his rational creatures should be good also. By the proofs he continually gives of his love of righteoufness, and his horror of fin, he speaks to the heart, and constantly perfuades us to walk in the paths he has prescribed. He directs our actions according to his views. He makes our undertakings fail when they are contrary to his merciful defigns; and he gives us means of quitting the paths of iniquity. What wife measures he took in order to lead the children of Israel to the falutary ends that he proposed. In vain did the idolatrous nations more than once conspire their destruction; they were still preserved by the protection of their God. He neglected nothing to maintain amongst them that pure and holy religion which diftinguish them from the blind and superstitious nations around them. But our God inhabits light inaccessible. There is a depth of wisdom in his government, which none but he can fathom. Our understandings are too weak to fee through the whole of his plans, or to form a just idea of his views, before the event has discovered them. Our knowledge is too limited to penetrate into the counsels of an infinitely

wife Being, or to discover beforehand the motives of his dispensations. The wicked man often fits among princes, whilft the righteous are humbled in the dust. The wicked triumph. and the good man is oppressed. Every thing fmiles on the bad; whilst the friend of God meets nothing but difgrace and difappointment: and yet there is a Providence. Notwithstanding all these apparent disorders, God is ever the tender Father of his creatures. He is their infinitely wife, just and equitable Ruler. All his dispensations are adorable, however impenetrable they may appear to us. His counfels are wonderful. His plans furpass our understanding, but they are always formed and executed with fovereign wisdom. All that happens in this world, and at which we often wonder, tends to excellent purposes. The load of affliction and mifery, under which fome groan, may possibly have the happiest effect on their future The apparent evil may perhaps be a neceffary medicine for the foul, and on this falutary correction may possibly depend their faith, the purity of their hearts, and their eternal felicity. Whoever is discontented with his lot, let him confider all these things, and he will cease to murmur. Why, O man! dost thou undertake to fathom the plans on which God governs the world? Thy understanding is limited, and yet thou pretendest to discover the Vol. II.

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views which the supreme Being proposes to himself. Thou canst not take in the whole chain of things which pass before thee. Thou knowest not what has preceded, or what is to follow, and yet thou hast the presumption to judge of causes and effects. Providence is just in all his plans, and all his dispensations. It is true that thou sees not always the motives of his conduct, but to be able to judge of them rightly, thou must be what God is.

AUGUST XXXI.

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HARVEST HYMN.

OUR fields crowned with bloffoms and with corn are a hymn to the Lord. The joy that sparkles in the eyes of the farmer is a hymn to the God of nature. It is he who makes the earth produce bread, and he that loads us with bleffings. Let us gather together, and fing praises to the Lord. Let his praise be evermore the subject of our song. Let us hearken unto the words he says unto us, from the bosom of our fertile fields. "The year will crown thee with bleffings, O world! thy happiness is my work, and I have called the spring; the crops and the harvest are the works of my power. The rich meadows, and the hills

"covered with corn, are mine." Yes, Lord, we behold thy greatness, and we feel the value of thy favours. It is through thee that we exist: life and food are the gifts of thy hands. Blessed be thou, O field, which produces food for man! Prosper, thou beautiful meadow! Be covered, ye forests, with a thick shade! O nature, be thou ever beneficent towards us! Then, from morn to night, will the Lord be the object of our praise. Free from cares, we will rejoice in his blessings; and our children will repeat after us: the God of Heaven is our Father, the Lord, the almighty Lord is God!

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